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# Technical COMMUNICATION

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## ARTICLES



## DEPARTMENTS



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# INSTRUCTIONS FOR AUTHORS

## About the Journal

*Technical Communication* is a peer-reviewed, quarterly journal published by the Society for Technical Communication (STC). It is aimed at an audience of technical communication practitioners and academics. The journal's goal is to contribute to the body of knowledge of the field of technical communication from a multidisciplinary perspective, with special emphasis on the combination of academic rigor and practical relevance.

*Technical Communication* publishes articles in five categories:

- Applied research – reports of practically relevant (empirical or analytical) research
- Applied theory – original contributions to technical communication theory
- Case history – reports on solutions to technical communication problems
- Tutorial – instructions on processes or procedures that respond to new developments, insights, laws, standards, requirements, or technologies
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- Page 2: Structured abstract – A summary of the article (maximum 250 words), using the headings "Purpose," "Method," "Results," and "Conclusion"
- Page 3: Up to five keywords and a practitioner's takeaway (maximum 100 words) displayed as a bulleted list summarizing the practical implications of the article
- Page 4: Start of the manuscript
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- Tables and figures – Start each table or figure on a new page. Assign each table and figure a number and title. If a manuscript is accepted for publication, provide high-resolution images.

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Miriam F. Williams, Editor

# Continuing our Conversation about Content

By Miriam F. Williams, Editor

This past May, I had the pleasure of attending the 2022 STC Summit in Chicago with the theme, "The Booming Business of Content: A New Era, New Opportunities." Like many of you, I left the event rejuvenated. After months of not traveling or attending face-to-face conferences, it was a pleasure to meet and greet so many colleagues from across industries and from around world. It was exciting to attend presentations where so many shared innovative ideas about content, including emerging trends and technologies. In reading this issue of *Technical Communication*, I could not help but notice that many of the presentations at the Summit were related to the topics in this issue of the journal. This issue includes research on new types of content to consider, new guidelines for instructional videos, a new model for extended reality, new social justice projects, and a new way to map the trajectory of the field.

I also noticed that the authors in this issue of *Technical Communication* continued, expanded upon, and updated their previous research as well as identified novel applications for established frameworks. This idea of continuation, returning to what we know to be useful, improving upon it, adding to it, correcting it, and implementing it anew, is not new in technical communication. The work of revising our own work or continuing the work of others are tools of our trade, which are very much evident in the excellent articles in this issue.

The first article in this issue is "Eleven Guidelines for the Design of Instructional Videos for Software Training," by Hans van der Meij and Constanze Hopfner. Appropriate for our new era of content, this study expands on guidelines previously proposed by van der Meij and van der Meij (2013). Hans van der Meij and Constanze Hopfner provide the *Technical Communication* audience with "novel guidelines about how to design the procedural discourse, video reviews, and background music" and provide "design advice on narrator presence on-screen and its effect on learning is provided."

In the second article in this issue, Satu Rantakokko continues research from the May 2022 issue of *Technical Communication* on extended reality. In the May issue, Satu Rantakokko shared "Data Handling Process in Extended Reality (XR) When Delivering Technical Instructions." In this issue, the author builds upon that research with a new model in "Creating a Model for Developing and Evaluating Technical Instructions that use Extended Reality." To introduce this the new model, the author explains, "The TIER model is introduced with examples to illustrate how it can be used to view every phase of XR data handling in terms of the affordances of technical instructions based on the laws, regulations, principles of good guidance, and the design process."

In the third article, "Countering Dominant Narratives in Public Memory," April O'Brien and Josephine Walwema continue O'Brien's research on historical marker texts (HMT) and Walwema's research on the ethics and tactical technical communication to explore efforts of the Equal Justice Initiative (EJI). The authors explain, "To do this work, we (1) establish HMTs as TPC public-facing informational reports that communicate historical knowledge (Haas, 2012; Markel & Selber, 2018, p. 449; O'Brien, 2021); (2) examine how county and state historical commissions actively impede attempts to erect HMTs that communicate the impact and significance of Black individuals or provide an accurate account of racialized injustices; (3) adopt the 4Rs heuristic (Walton, Moore, & Jones; 2019) as a coalitional, truth-telling tactic to redress inequalities in public memory; and (4) bring together EJI's uses of the 4Rs and tactical technical communication to memorialize the lives of the victims of terror lynching."

In the fourth article, "World-Traveling to Redesign a Map for

## Continuing our Conversation about Content

Migrant Women: Humanitarian Technical Communication in Praxis," Gabriel Lorenzo Aguilar uses Maria Lugones' practice of world-traveling to redesign maps for migrant women. In this article, the author explains, "World-traveling is the practice of seeing through another's eyes to anticipate what they may need (Lugones, 2003). It calls us to travel from our privileged "worlds," spaces we inhabit as scholars, into the worlds of vulnerable populations. The practice helps researchers understand the worlds of marginalized populations and help them. I world-travel to migrant women in an archive to improve a map that migrants use to find water in the Arizona desert." In this article, the author warns practitioners, scholars, and students about the ethical implications of misusing this practice as well as the benefits if used, justly.

Finally, in "Mapping the Evolutionary Characteristics of Global Research Related to Technical Communication: A Scientometric Review" by Mingdan Luo, Dorothy DeWitt, and Norlidah Alias, the authors use visualization software to map the field's research over the past twenty years. The authors state, "Visualization software was employed to analyze co-citation and co-word networks from 2,183 articles published in Web of Science and Scopus databases from 2001 to 2020." This article can help managers and technical communicators identify trends, help students identify potential career paths, and help researchers identify conversations to expand on and continue.

# On the Cover

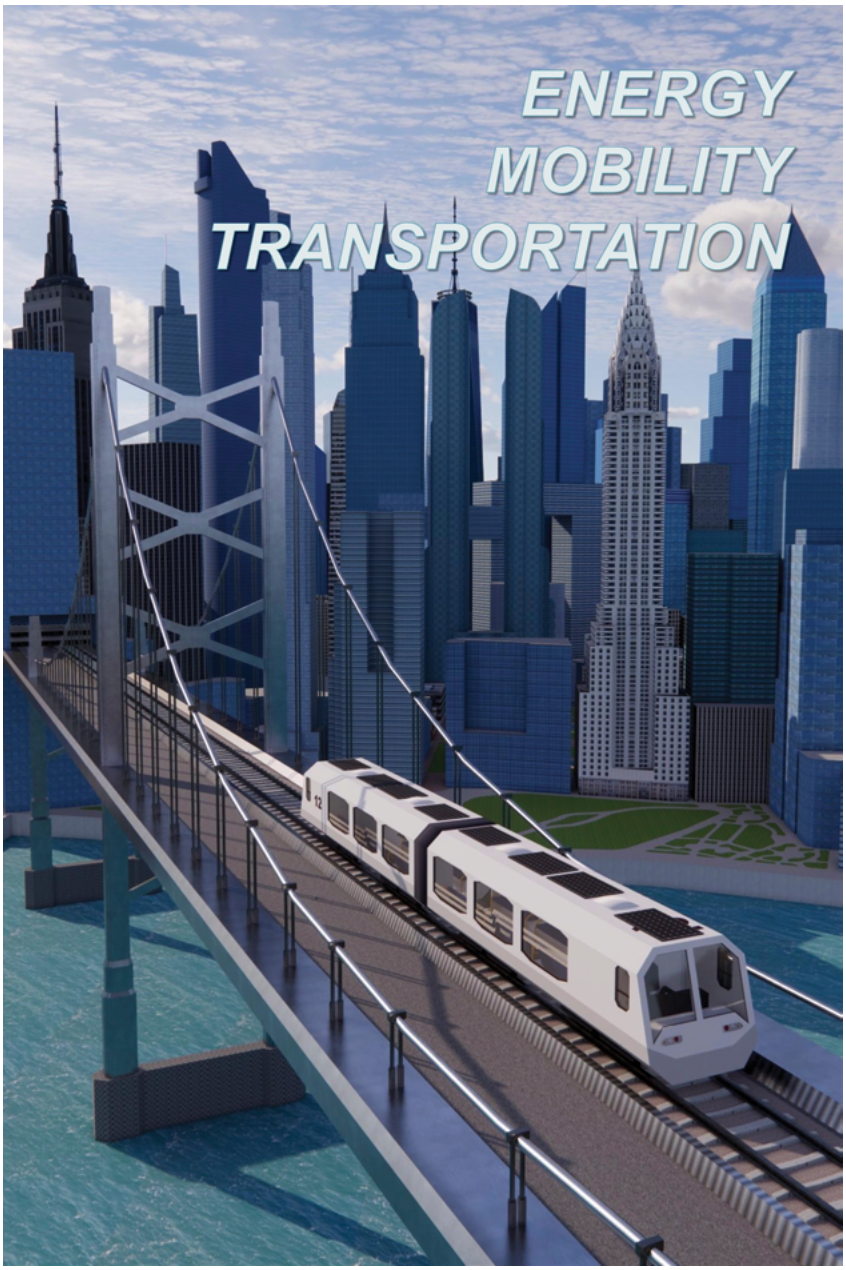
## ARTIST'S NOTE

For the cover illustration contest theme, "energy, mobility, and transportation technologies," I chose to feature a train. I've always been fascinated with this type of transportation and have always thought it was the coolest form of it. To illustrate this energetic feel, I focused on the color scheme and made sure to include colors like orange and yellow to represent energy. The addition of cooler tones was to add contrast and to bring one's eye to the focal point of the cover, the train itself. The additions of shadows and shading were included to add more aesthetic value to the piece overall.

## ABOUT THE ARTIST

Logan Plummer is a recent graduate of Eastern Kentucky University, where he earned a BA in English and a certificate in Technical Writing. These programs heightened Logan's interests in writing, from drafting stories to collaborating on group projects. In addition to writing, Logan enjoys working to improve his skills in other areas, including graphic design and general art. He is available at logan_plummer3@mymail.eku.edu.

# Honorable Mention




## ARTISTS' NOTE

To answer the call for cover illustrations on the topic "energy, mobility, and transportation technologies," we created an image to convey the idea of futuristic public transportation. Our image, which shows a solar powered public train that could potentially save our environment by reducing pollution, helps to provide a green and health way for individuals to go about their day. By applying solar panels on world's transportation, it could protect our world's ecosystem by replacing depletable resources/energy (i.e., fossil fuels) to renewable resources/energy (i.e., solar energy). In addition, it could also cut down greenhouse emmissions by applying solar energy, because fossil fuels are one of the main factors that causes greenhouse emmisions to go up. The mechanism of it is to use solar energy (from solar panels) to power the train instead of using regular fossil fuels which would reduce the pollution significantly and increase the air quality of the world. Our image was designed by using a program called Sketch Up, and it only involves a few elements: the background, train, and solar panels. We want our image to be easily perceived by our audience to help them understand how energy, mobility, and transportation technologies can be depicted.

## ABOUT THE ARTISTS

Feng Liu is currently a junior Economics major with a minor in Entrepreneurship at the University of Delaware. Feng is enthusiastic about studying economics and entrepreneurship and eager to explore the secrets of successful businesses through coursework. Feng Lieu is available at fengliu@udel.edu.

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# Eleven Guidelines for the Design of Instructional Videos for Software Training

doi: https://doi.org/10.55177/tc786532

By Hans van der Meij and Constanze Hopfner


## ABSTRACT

**Purpose:** Video is a popular medium for instructing people how to use software. In 2013, van der Meij and van der Meij proposed eight guidelines for the design of instructional videos for software training. Since then, production techniques and video features evolved, and new insights about characteristics of effective video instructions emerged.

**Methods:** Based on recent study outcomes and our reflections on instructional video designs, the original set of eight guidelines was restructured, updated, and extended.
**Results:** A new framework with 11 guidelines was constructed. For these guidelines the article provides scientifically-based advice for the design of instructional videos for software training.

**Conclusion:** The new framework and the illustrations of how the guidelines were applied in videos should provide useful insights for further practice and research on instructional video design.


**KEYWORDS:** instructional video, design characteristics, software training, procedural knowledge development

## Practitioner's Takeaway

- The 11 guidelines presented in this paper extend earlier work that offered eight guidelines for designing instructional videos for software training.
- Novel guidelines about how to design the procedural discourse, video reviews, and background music are discussed. In addition, design advice on narrator presence on-screen and its effect on learning is provided.

# Eleven Guidelines for Designing Instructional Videos

## INTRODUCTION

With COVID-19, educators around the world have been challenged to provide students with ample opportunities for online arrangements to support learning. The kinds of options that are chosen partly depend on the goals that must be achieved. For procedural knowledge development, an instructional video is a good candidate because it can present a model of task performance (Grossman et al., 2013). This article concentrates on the design of this type of video. More specifically, the focus is on presenting a set of guidelines for the design of instructional videos for software training.

In 2013, van der Meij and van der Meij proposed a framework for the support of procedural knowledge development in software training that consisted of eight design guidelines. The guidelines were based on multi-media theory and demonstration-based training. The framework has since served as the foundation for constructing instructional videos in several recent studies on software training (e.g., Garrett, 2021; Kelly, 2017; Kokoç, Ilgaz, & Altun, 2020; Randhave et al., 2019). For instance, Randhave et al. used it to create an instructional video for an electronic medical record training intervention, and Garrett used the eight guidelines for constructing an instructional video on Excel's conditional formatting features. More generally, since its conception, the framework has frequently been cited for including one or more of its guidelines in instructional video designs (e.g., Cudmore & Slattery, 2019; Espino, Artal, & Betancor, 2021; Käfer, Kulesz, & Wagner, 2017).

The present study restructured, complemented, and reformulated the eight guidelines framework based on recent research findings and our careful reflection on new insights for instructional video designs. Among others, a guideline was added to provide designers with information on the kind of content they should present in procedural discourse. According to this new guideline, such discourse should invariably give information on two components (i.e., goals, and actions and reactions) and may include information on two optional ones (i.e., prerequisites and unwanted states) depending on circumstances. In addition, some guidelines were reformulated to make these clearer. For instance, the guideline to "Provide easy access" was changed into "Support users in finding a suitable video" to which two detailed guidelines were added for more concrete support. Figure 1 presents the new and more comprehensive framework of the 11 guidelines.

Just as in the original framework, the guidelines were formulated broadly enough to cover a large audience and diverse contexts. The following sections describe the reason(s) for proposing each guideline, state their theoretical rationale, and present a summary of available empirical support (if any). The article concludes with a brief discussion on the possibilities and limitations of the new framework.

1. **Keep instructional videos short**
   - 1.1 Create an instructional video of maximally 6 minutes
2. **Support users in finding a suitable instructional video**
   - 2.1 Describe the user's goal in the video title
   - 2.2 Include the software name and version in the video title
3. **Preview the task**
   - 3.1 Promote the goal with illustrations of start and end states
4. **Use a screencast with narration**
   - 4.1 Mainly use spoken words
   - 4.2 Occasionally use written words in the form of labels
   - 4.3 Use a natural-sounding (human or computer-generated) voice for the narration
5. **Support an action-oriented approach**
   - 5.1 Mainly provide procedural information
   - 5.2 Occasionally provide conceptual information about the underlying rationale
6. **Consider the key components of a well-designed procedure**
   - 6.1 Present goal information
   - 6.2 Occasionally present information about prerequisites
   - 6.3 Present information about actions and reactions
   - 6.4 Occasionally present information about unwanted states
7. **Make the task demonstration easy to follow and mimic**
   - 7.1 Use a conversational narration style
   - 7.2 Describe the action sequence chronologically
   - 7.3 Trigger actions with menu-based choices instead of keyboard shortcuts
   - 7.4 Use visual highlights to guide the users' attention
8. **Support users in handling the transitory nature of the video**
   - 8.1 Vary the narrator's speech rate according to task complexity
   - 8.2 Split a long video into meaningful segments
   - 8.3 Include deliberate pauses after segments
   - 8.4 Visually demarcate segments on the video timeline
   - 8.5 Show the narrator during explanations only
9. **Review the task**
   - 9.1 Provide a concise summary of the main steps in task execution
10. **Strengthen demonstration with practice**
    - 10.1 Provide links to practice files and highlight these in the narration and video description
    - 10.2 Enable practice immediately after a task video
11. **Occasionally include background music**
    - 11.1 Select background music that fits the content of the video

**Figure 1. Eleven guidelines for the construction of instructional videos for software training**

## GUIDELINES

### Guideline 1: Keep Instructional Videos Short

An important consideration in instructional video design is to prevent early dropout. After all, users can only learn from video segments they have actually viewed. Shorter instructional videos are better at keeping the user aboard than are longer ones. Figure 2 shows the guidelines for optimizing user attendance to an instructional video.

1. **Keep instructional videos short**
   - 1.1 Create instructional videos of maximally 6 minutes

**Figure 2. Guidelines for optimizing user attendance to an instructional video**

There are different recommendations for what is a good length of an instructional video. A questionnaire among SAP users indicated that they prefer a length of maximally 90 seconds (Huxhold & Luther, 2013). Wistia, a video hosting platform that uses data mining techniques to discover the optimal length for a video, found two minutes to be a sweet spot after which a rapid loss of audience sets in (Fishman, 2016). Finally, Guo, Kim, and Rubin (2014) who used data mining to suggest the proper length of EdX videos recommended segmenting such videos in chunks of less than six minutes. In our own experience, 90–120 seconds is cutting it a bit short, even for instructional videos that explain only one software task. We also found a six-minute length to be sufficient for nearly all task explanations. In addition, a recent survey revealed that users of YouTube videos prefer a length of maximally six minutes (Dascălu et al., 2020). Therefore, this is our recommended length.

### Guideline 2: Support Users in Finding a Suitable Instructional Video

Users must overcome at least two hurdles when searching for a suitable instructional video. The first obstacle is finding good candidates; this means locating potentially relevant instructional videos. The second barrier is judging suitability. Users should be able to quickly appraise whether the instructional video is likely to offer a solution to their problem (see Brand-Gruwel, Wopereis, & Vermetten, 2005). Figure 3 shows the guidelines for providing easy access to a pertinent instructional video.

# Eleven Guidelines for Designing Instructional Videos

**2. Support users in finding a suitable instructional video**
- 2.1 Describe the user's goal in the video title
- 2.2 Include the software name and version in the video title

**Figure 3. Guidelines for providing easy access to a pertinent instructional video**

The heading or title plays a vital role in the user's information search processes. In his streamlined step model, Farkas (1999) argued that a title is a mandatory component in (nearly) all procedural discourse. The model dictates that the title should be crafted carefully so that it clearly conveys the task that is demonstrated in the instructional video; the title should give the user a succinct goal description. Also, the title should be concrete rather than abstract. That is, research has shown that texts with concrete titles are deemed easier to comprehend, more interesting, and more motivating to study than texts with abstract titles (Lippmann et al., 2019). In short, the title should describe the general action in concrete terms and represent the purpose of the procedure.

To add to the concreteness of the video title, we also recommend including the software name and version. The presence of this information in the title may speed up the video selection process for users. It may alert users to the fact that software options and procedures can vary across versions and they should look for the matching one, and it facilitates the search of users who already know that they need instructions for a specific software version.

## Guideline 3: Preview the Task

A preview provides a structural overview of what is covered in an instructional video. It can be presented to support the decision for further study and facilitate the user's information processing. That is, the information can motivate the user to engage with the video, activate prior knowledge, and provide an ideational scaffold that makes it easier for the user to understand the instructions. Figure 4 shows the guidelines for preparing the users for a task demonstration in an instructional video.

**3. Preview the task**
- 3.1 Promote the goal with illustrations of start and end states

**Figure 4. Guidelines for preparing the users for a task demonstration in an instructional video**

Empirical research with paper-based instructional materials has repeatedly shown that advance organizers are conducive to learning (e.g., Gurlitt et al., 2012; Mayer, 1979; Roohani, Jafarpour, & Zarei, 2015; Teng, 2020). A preview is the multimedia alternative. A preview is a short, animated presentation that informs the user about the goal and the procedure to achieve it.

The goal information in the preview is important for making relevance judgments. It provides the basis for the user's decision whether watching the video is worth the time (Almeida, Leite, & Torres, 2013). Motivational theories such as goal-setting (Locke & Latham, 2002) and expectancy-value theory (Eccles & Wigfield, 2002) invariably emphasize that goal information contributes to the users' task engagement. Preferably the user is presented with goals that are specific and clear. One particularly effective means for presenting such information comes from showing both the start and end state. Figure 5 shows an example of an illustrated start and end state from an image editing video.

A preview should also provide the user with a succinct view on the main action steps needed to achieve the goal. The procedural information in the preview shows the user the main trajectory in task execution. This procedural overview can serve as an anchor point for the demonstration that follows.

There is very little empirical research on previews in software training, and to our knowledge, only two studies have been reported in the literature (van der Meij, 2014, 2019). These studies reveal that a preview that elucidates the goal and animates the procedure enhances the user's task performance during and after training.

**Figure 5. Illustrated start and end state in an image processing video. The side-by-side presentation conveys the effect of increased resolution for achieving a higher quality picture (Source: MagicalFruitTuts, 2013)**

## Guideline 4: Use a Screencast with Narration

Instructional videos for software training usually come in the form of recorded demonstrations (Plaisant & Shneiderman, 2005). The demonstration animates the actions on the software, providing the user with a dynamic image of task progression on the interface. The narration accompanies the unfolding scenario. It gives the user a rationale for task execution and describes the distinct action steps therein. Figure 6 shows the guidelines for presenting the words and pictures in an instructional video.

**4. Use a screencast with narration**
- 4.1 Mainly use spoken words
- 4.2 Occasionally use written words in the form of labels
- 4.3 Use a natural-sounding (human or computer-generated) voice for the narration

**Figure 6. Guidelines for presenting the words and pictures in an instructional video**

Instructional videos offer the designer the opportunity to use both pictures and words for instructing the user. The combination of the two modalities should be carefully considered. Multimedia learning theory has advanced several design principles for this coupling that have repeatedly been validated in empirical research. According to the multimedia principle, people learn more from a meaningful combination of words and pictures than from words alone (Butcher, 2014). Multimedia research has further shown that it is better to use spoken words rather than written words (e.g., on-screen text). This is captured in the modality principle which holds that written words compete with pictures for user attention which reduces learning (Mayer & Pilegard, 2014).

Furthermore, it has been found that learning is hampered when the spoken and written words in a multimedia presentation are identical. This finding has led to the redundancy principle which holds that duplication of spoken and written words unnecessarily taxes the user and hampers learning (Mayer & Fiorella, 2014). Regarding the joint presence of spoken and written words, it has, however, also been found that a careful combination of the two can actually benefit the user. Such a situation occurs when summarizing labels are included (Koumi, 2013), or when one or two key terms from the narration are presented in written form next to the relevant part of an image (Adesope & Nesbit, 2012). Such designs create a desirable difficulty that stimulates the user to actively process both kinds of information, which has been found to enhance learning (Yue, Bjork, & Bjork, 2013). Figure 7 presents an example of an instructional video that uses written (on-screen) labels to convey key terms described in the narrative.


**Figure 7. The presentation of a written label in a sound editing video (Source: FL Studio Guru, 2010)**

According to the voice principle in multimedia learning theory, it is better to use a human voice over a computer-generated one (Mayer, 2014b). That is, research has found that a human voice is more conducive to learning than a computer-generated one because the latter is more difficult to understand. Empirical support for the voice principle rests on a limited set of relatively older studies, however. Because text-to-speech software is widely available nowadays and also has improved considerably in the last decade, the question can be raised whether the voice principle still holds. Recent studies comparing a modern computer-generated voice to a human voice have found no learning advantage of either type of voice (e.g., Castro-Alonso et al., 2021; Craig & Schroeder, 2019; Davis, Vincent, & Park, 2019). In other words, provided that modern software is used in production, a computer-generated voice and a human voice can be equally effective for learning.

## Guideline 5: Support an Action-Oriented Approach

A majority of users are likely to consult an instructional video for assistance in task achievement; users' primary interest lies in receiving procedural rather than conceptual information. Prioritizing showing over explaining fits an action-oriented approach to software

documentation (Carroll, 1998). In an instructional video, this approach generally results in a design that revolves around a demonstration of a task performance (Brar & van der Meij, 2017; van der Meij, 2017). In that demonstration, the user should be given conceptual information only when and where such information is needed. Figure 8 shows the guidelines for making actions easy to follow and mimic in an instructional video.

**5. Support an action-oriented approach**
- 5.1 Mainly provide procedural information
- 5.2 Occasionally provide conceptual information about the underlying rationale

**Figure 8. Guidelines for making actions easy to follow and mimic in an instructional video**

People who turn to an instructional video on software are primarily interested in achieving tasks. The main body of information in the instructional video should, therefore, be action-oriented and hence consist of procedural information. It should be a priority in design to give information that enables or guides the user's task completion (Brar & van der Meij, 2017; Kim, Nguyen, et al., 2014).

At the same time, users also often need information with which to plan and evaluate their actions. Instructional videos should, therefore, also give conceptual information to explain the rationale for a procedure and to reveal underlying principles (see Clark & Mayer, 2016). But this information should be limited. An abundance of explanatory information can make an instructional video too wordy and lose its efficiency (Shoufan, 2019), or worse yet, the user may be put off and quit viewing early.

## Guideline 6: Consider the Key Components of a Well-Designed Procedure

An instructional video should inform the user of all the information needed to accomplish a task. The Four Components model (van der Meij, Blijleven, & Jansen, 2003; van der Meij & Gellevij, 2004) can serve as a framework for designing procedural discourse. According to this model, such a discourse generally consists of two mandatory and two optional elements. The information types that should always be present are the goal, and action and reaction components. Goal information gives direction and purpose to the user's actions. Information about user actions on, and responses of the software (reactions), capture the process of human-computer interaction that is at the core of every procedural discourse involving software. During task performances, the user occasionally benefits from receiving information about prerequisites and unwanted states. Information about prerequisites alerts the user to necessary system states and pertinent prior knowledge and skill. Information about unwanted states helps the user avoid certain mistakes and assists in error management. Figure 9 shows the guidelines for presenting the content of a procedure in an instructional video.

**6. Consider the key components of a well-designed procedure**
- 6.1 Present information about the goal
- 6.2 Occasionally present information about prerequisites
- 6.3 Present information about actions and reactions
- 6.4 Occasionally present information about unwanted states

**Figure 9. Guidelines for presenting the content of a procedure in an instructional video**

A goal is an objective that can be achieved with a procedure. Goal information enables the user to assess whether there is a match with the desired state (Farkas, 1999). In addition, it gives the user information about the direction of the actions that are to be performed. In instructional videos, the main goal is often codified in the title, but there should also be information about intermediate and end states in the procedural discourse itself. That is, one should expect to find goal statements right before the start of a procedure and as part of an action statement that describes an interim state. Such goal statements may precede the action information (e.g., in a sound editing video: "Now we're gonna look for a section that only has the noise."), or follow afterwards (e.g., in an image editing video: "We're going to open this picture in a new document so we can increase the resolution.").

Prerequisites are conditions that must be satisfied before the user can engage in a task procedure. There are two kinds of prerequisites: system states and user knowledge and skill (van der Meij et al., 2003). System states describe the start position or necessary material for the procedure. The start position is presumed to be present, or the user is expected to know how to get there. That is, the prerequisite state is simply depicted or described (e.g., "You should

see the home page."; "The Frequencies menu should be visible."). For necessary materials, the user is simply told to access a pertinent file. Prerequisites also concern the foundational knowledge and skills needed to successfully engage in a task procedure. An instructional video may mention these prerequisites to help the user decide whether to continue with the video or to address the prior knowledge or skills first. For instance, an instructional video may alert the user to a necessary fact or concept (e.g., "You should already know styles."; "Recall that a style is a set of formatting characteristics."), or it may state what the user already needs to be able to do (e.g., "You should already know how to select styles.").

The action and reaction component forms the heart of any procedural discourse. Addressing only the user actions would unduly ignore the effects on the system; it is too easily forgotten that user actions evoke software reactions that enable new user actions. To do justice to this intricate relationship, the Four Component model considers actions and reactions in tandem (van der Meij et al., 2003; van der Meij & Gellevij, 2004). While it may not be necessary to connect each action command with a software reaction, the instructional video should provide enough system state information so that users can easily monitor task progress. A typical example of an action statement and the feedback that may follow is: "Double-click the margin at the top or bottom of your document. This will 'unlock' the header or footer area."

Errors or unwanted states are situations that the user should avoid getting into. A prominent advocate of addressing error in user documentation is the minimalist approach (van der Meij & Carroll, 1998). Several empirical studies conducted from this perspective have supported claims that the presence of information with which the user can detect, diagnose, and correct mistakes contribute to motivation and learning (e.g., Lazonder, 1994; Lazonder & van der Meij, 1995). A recent literature review on error-inclusive approaches in software documentation and training (van der Meij & Flacke, 2020) substantiated these findings. It reported that error-inclusive approaches significantly enhanced task performances after training and helped develop error-management skills (including the capacity to deal with the frustration that usually comes with error).

## Guideline 7: Make the Task Demonstration Easy to Follow and Mimic

An instructional video should consist of easy-to-understand, concise, prototypical descriptions on how to achieve a task. One of the ways for doing so is to employ a conversational style in the narration. Also, when tasks and actions are presented in a simple-to-complex sequence, users can gradually build up their knowledge, and effort in learning new procedures is reduced. Furthermore, it is easier for the user to process action instructions that involve menu-based choices instead of (arbitrary) keyboard shortcuts because a menu-based approach offers the user semantically meaningful information for what needs to be done. Finally, to the uninitiated user, an interface may pose a challenging context for finding the information that they need. Users, therefore, often benefit from highlighting to guide their attention to key objects or locations on the interface. Figure 10 shows the guidelines for making task demonstrations clear and simple in an instructional video.

**7. Make the task demonstration easy to follow and mimic**
- 7.1 Use a conversational narration style
- 7.2 Follow the user's mental plan in describing an action sequence
- 7.3 Trigger user actions with menu-based choices instead of keyboard shortcuts
- 7.4 Use visual highlights to guide the user's attention

**Figure 10. Guidelines for making task demonstrations clear and simple in an instructional video**

The narrative in an instructional video can be given in a formal or conversational style. A formal style is characterized by the frequent use of the passive voice and a narrator staying in the background. In contrast, a conversational style addresses the user as "you" and the designer is foregrounded through the use of "I." Also, an effort is often made to create a shared perspective by using words such as "we" or "us" for intentions or goals. Empirical research on multimedia presentations shows that a conversational style is easier to understand and yields more learning than a formal style (Ginns, Martin, & Marsh, 2013).

The guideline to follow the user's mental plan in describing an action sequence refers to the desirability to present tasks in a simple-to-complex sequence so that the user can keep up with increasing levels of

## Eleven Guidelines for Designing Instructional Videos

task complexity (van Merriënboer & Kester, 2014). When easier tasks are presented before more difficult ones, an optimal balance can be obtained between what the user already knows and the new knowledge that must be acquired. On a more detailed level, this guideline suggests that an action instruction is easier to understand and follow when it mentions successive events in the correct order (Clark & Clark, 1968). For action instructions, this means that they should begin with the antecedent condition before presenting the action information. Thus, it is better to state "On the Insert menu, click Pictures" than to use "Click Pictures, on the Insert menu."

Another way of making tasks clear and simple lies in following a menu-based approach for triggering an action instead of telling users what keyboard shortcut they should press. A menu-based approach is semantically meaningful and, therefore, easier to learn than a keyboard shortcut approach which has the advantage of being more efficient. Occasionally, the two approaches are combined to facilitate the transition from one to the other type of user action (e.g., Cockburn, Gutwin, & Scarr, 2014; Cui et al., 2019).

A prevalent way of facilitating the processing of task information in instructional videos comes from the use of visual highlighting. Signals can guide the user's attention to essential screen elements, helping the user perceive key points of information without adding content. Figure 11 illustrates a case of visual highlighting in a sound editing video. The red circle guides the user's attention to the location of the cursor which could otherwise be missed. In addition, signals can support the user in organizing and integrating the information (van Gog, 2014). Highlighting has been extensively studied in multimedia research. The results of these studies are conveniently summarized in two recent meta-studies. Richter, Scheiter, and Eitel (2016) found that highlighting enhanced learning. In addition, the authors noted that this effect was especially strong for users with low prior knowledge. The meta-study from Schneider, Beege, Nebel, and Ray (2018) also found a learning effect as well as positive effects on motivation and learning time. However, this study found no moderating effect of prior knowledge.

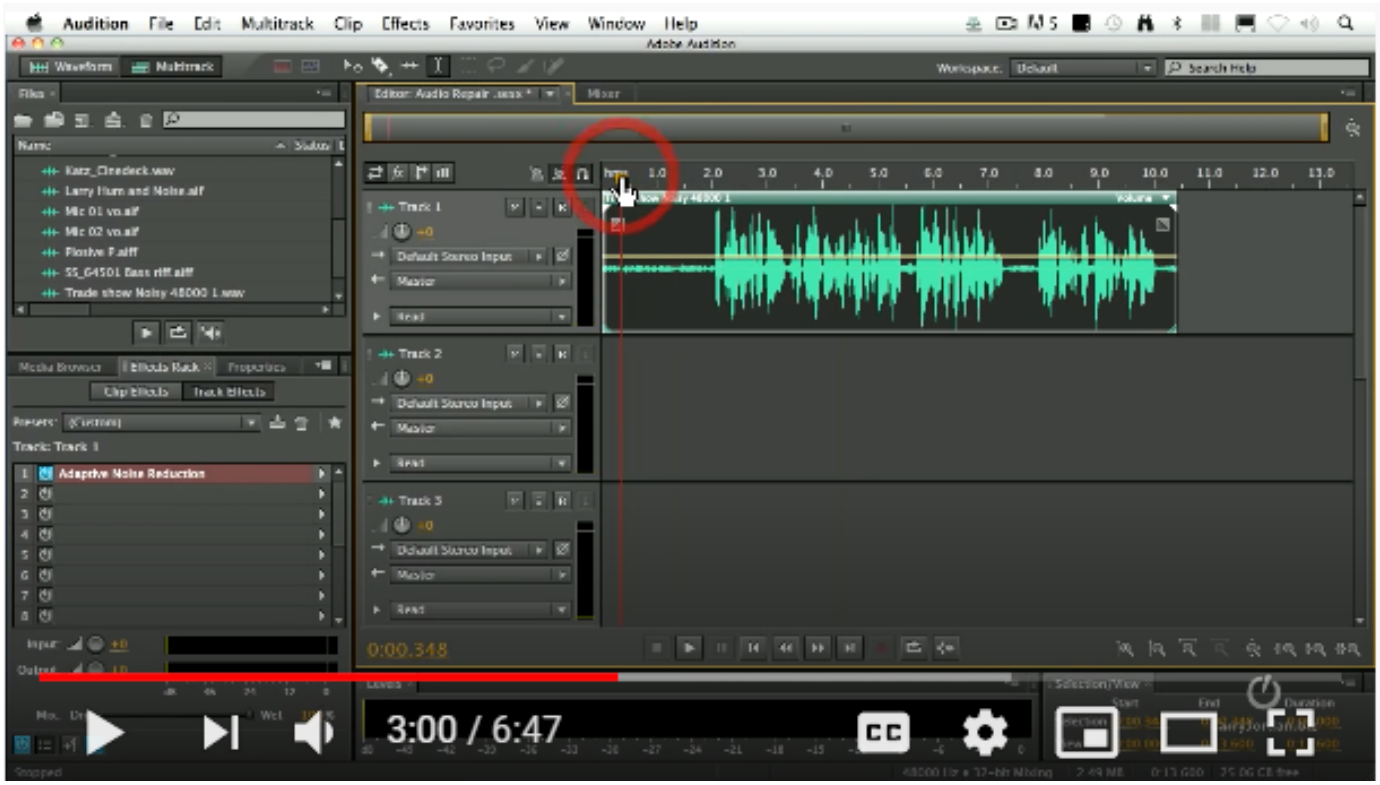


**Figure 11. An example of visual highlighting in a sound editing video (Source: Jordan, 2013)**

## Guideline 8: Support Users in Handling the Transitory Nature of Video

One of the complicating factors in processing instructional videos is their transitory nature. The speed of an instructional video plays an important role in how well users keep motivated and can handle the ongoing stream of information (compare Cohn & Foulsham, 2020; Huff, Meitz, & Papenmeier, 2014). Setting the right pace for the instructional video is a matter of handling the complex interplay of auditory and visual information. The visual and auditory information in an instructional video should move at a pace that enables the user to perceive the task demonstration accurately and comprehend its content (Tversky, Bauer-Morrison, & Bétrancourt, 2002). There is always a risk of creating an instructional video that is too slow for some viewers and too fast for others. If the instructional video runs too slow, users may lose patience (Johnstone & Scherer, 2000). If it runs too fast, users may not be able to comprehend the information because it overtaxes their cognitive resources (Lang, 2000; Lowe & Boucheix, 2016). In both cases, users may stop viewing. As users can only learn from the video segments they have watched, it is paramount that they are motivated to watch the entire video. Figure 12 shows the guidelines for supporting the users' handling of the transitory nature of instructional videos.

| | |
|---|---|
| **8.** | **Support users in handling the transitory nature of video** |
| 8.1 | Vary the narrator's speech rate according to task complexity |
| 8.2 | Split a long video into meaningful segments |
| 8.3 | Include deliberate pauses after segments |
| 8.4 | Visually demarcate segments on the video timeline |
| 8.5 | Show the narrator during explanations only |

**Figure 12. Guidelines for dealing with the fleetingness of an instructional video**

One way to manipulate the native pace of a video is to vary the speech rate. The speech rate is a words per minute (wpm) count. Although this rate is a rather crude indicator for a video's speed (Park & Bailey, 2018), it can be helpful for setting the pace by comparing the speech rate to a benchmark number. By and large, a rate of less than 110 wpm is considered slow, between 120–150 wpm moderate, and more than 160 wpm is seen as fast (Dugdale, 2010). An average speech rate should enable the audience to keep track during most of the video.

Users can also deal with the fleetingness of an instructional video by manipulating the video native playback speed. To give an example, YouTube enables users to play a video at 25%–200% of the original speed. When users can set the speed to match their needs, this may certainly help them process the video content properly. Nevertheless, we recommend that the video pace should be somewhat varied as more complex sections and less experienced users benefit from a slower than average presentation, whereas easy sections and more experienced users benefit from an above-average pace.

The user's processing of an instructional video can also be facilitated by creating clearly demarcated segments. Splitting an instructional video into sections should be done in a meaningful manner. When the segments reflect the structural components or main events in an instructional video, they support the user's mental model development (Lowe & Boucheix, 2016). Empirical research has shown that segmentation reduces cognitive load and raises learning (Rey et al., 2019).

In experimental research, segmentation is often user-paced which means that the instructional video comes to a full stop after the segment and then needs to be set into motion again by the user. A less disruptive, and in our view a better alternative to built-in stops, is to include a deliberate pause after each segment. A deliberate pause is a brief 2–5 second interruption of the flow of information. During such a pause, no new visual or auditory information is presented. After the pause, the instructional video automatically resumes its course. Empirical research has shown that deliberate pauses facilitate learning through two main effects: first, they buy processing time which allows the learner to reflect, and second, they signal event boundaries to users by demarcating segments (Spanjers et al., 2012).

The designer may also want to signal the segments with timeline markers to facilitate within-video navigation and information search. These markers are section dividers on the timeline that reflect the organizational structure of an instructional video. Therefore, they provide an easy way to browse to and from key points. Empirical research shows that timeline markers can significantly facilitate navigation in an instructional video (Cojean & Jamet, 2017, 2018,

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2021; Kim, Guo, et al., 2014). Figure 13 shows an example of timeline markers on a YouTube video called "chapters" on this platform. Video owners can segment their video's timeline and give segments informative names. Segments are visually separated through small gaps in the timeline. When users hover over a segment, its name and a preview image are shown. Such timeline markers make a search for information within a video easy and convenient for users.

The added presence of a visible narrator, usually in the form of a talking head, is becoming a more common feature in instructional videos (Pi et al., 2020). Figure 14 (next page) shows an example of a visible narrator in a sound editing video. The task demonstration and the narrator (bottom-right corner) are shown simultaneously. The primary reason for the inclusion of the narrator is to socialize the user's experience. Recent studies show that the presence of a narrator during an instructional video can enhance the users' feelings of social presence and enjoyment (Wang, Antonenko, & Dawson, 2020), and may draw the users' attention to key interface aspects and thereby benefit learning (Pi et al., 2020; Wang et al., 2020). However, there is also research that found the visible presence of a narrator distracting and without learning benefits (van Wermeskerken, Ravensbergen, & van Gog, 2018). Yet another study reported that while students favored and enjoyed instructional videos with a visible narrator, learning was higher when no narrator was presented (Wilson et al., 2018). In view of these mixed findings, we favor the advice of Guo, Kim, and Rubin (2014) who suggest showing the narrator at opportune times in an instructional video. During task demonstrations, a visible narrator may distract the user's attention from key changes in the software and these moments, therefore, seem not suitable. More opportune moments for the visible presence of a narrator are the explanations given before or after a task demonstration. Just as in segmentation, the narrator then alerts the user to the arrival of a new event.

## Guideline 9: Review the Task

A review is a brief outline of a task demonstration. As a recap of the main events involved in task performance, a review provides the user with a summary of how task completion is achieved. Thus, it can serve as a frame of reference and as a check for understanding. In addition, a review can boost recall as key information is presented in condensed form. Figure 15 shows the guidelines for facilitating recall of an instructional video.

| | |
|---|---|
| **9.** | **Review the task** |
| 9.1 | Provide a concise summary of the main steps in task execution |

**Figure 15. Guidelines for facilitating recall of an instructional video**

Effects of reviews in instructional videos for software training have been investigated only recently. In virtually all studies that compared a task demonstration without review (control condition) with a task demonstration that ends with a review (experimental condition), positive effects on learning have been reported. These effects appear to be

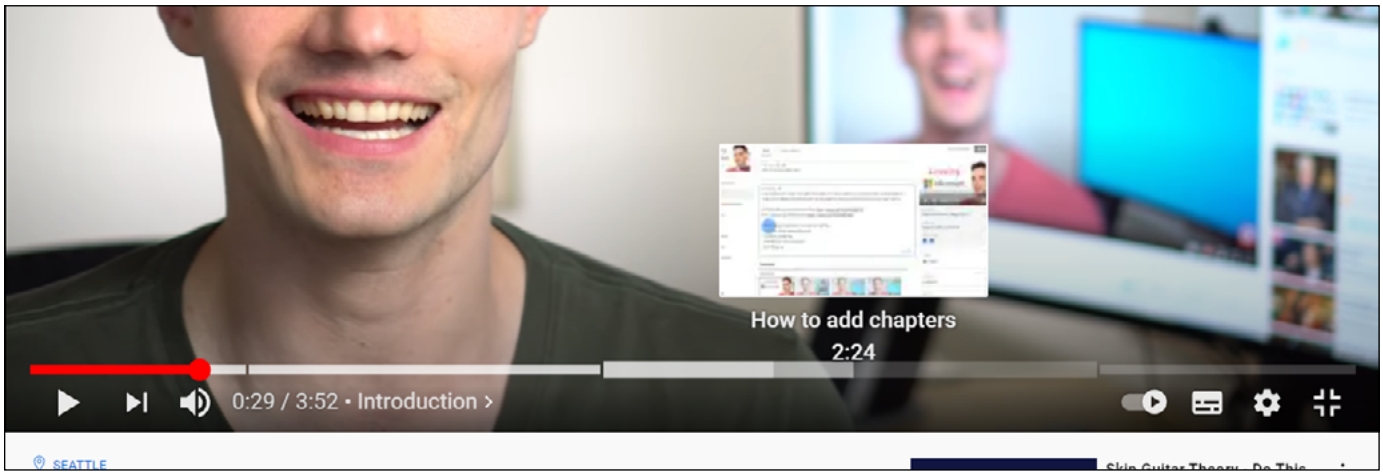


**Figure 13. Example of timeline markers in a YouTube video (Source: Stratvert, n.d.)**

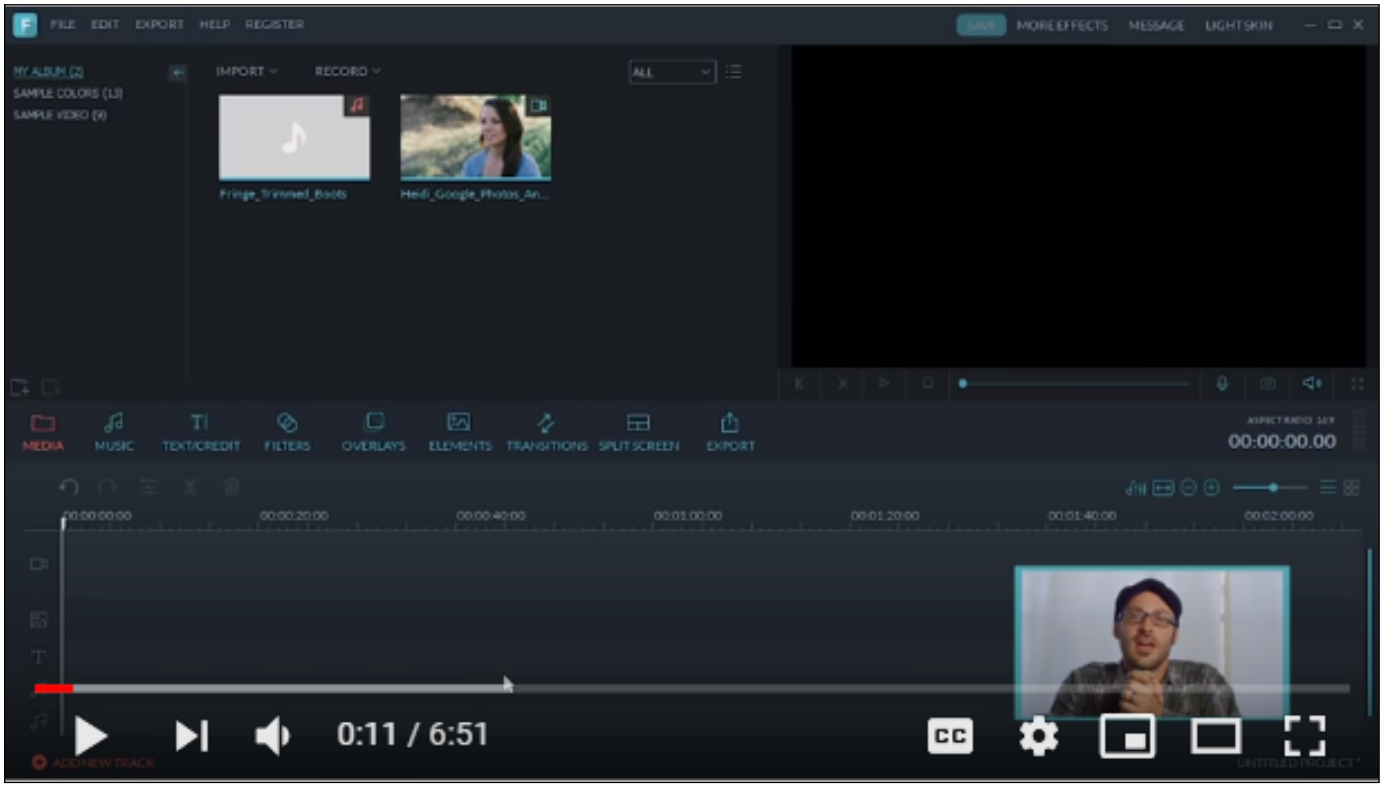


**Figure 14. A sound editing video that shows the narrator during a task demonstration (Source: Wondershare Fimora Video Editor, 2016)**

constrained by task complexity. For simple procedural training tasks involving text processing software, reviews have been found to raise learning significantly (van der Meij, 2017; van der Meij & van der Meij, 2016a,b). Smaller, non-significant effects have been reported for reviews in statistics software training where learning depends on a combination of acquiring knowledge of procedures, concepts, theories, and formulas (Brar & van der Meij, 2017; van der Meij & Dunkel, 2020). Although the strength of the effect varied, the presence of a review consistently aided learning and is therefore recommended in software training.

## Guideline 10: Strengthen Demonstration with Practice

Observing a model performing a software task can induce passive processing and give the user a false impression of capacity to perform the task. Practice can mitigate this risk. When the user engages in task practice, it may prompt the user to revisit the instructional video or stimulate more active processing of the instructional videos that follow. In addition, practice can consolidate a procedure when it reinforces what the user remembers. In Bandura's (1986) social learning theory, practice enhances the production process. The main guideline for supporting this process is to facilitate the user's hands-on experience in completing tasks that resemble the demonstrated performance. Figure 16 shows the guidelines for enhancing learning task accomplishments from an instructional video.

**10. Strengthen demonstration with practice**
- 10.1 Mention links to practice files in the narration and video description
- 10.2 Enable practice immediately after a task video

**Figure 16. Guidelines for enhancing learning task accomplishments from an instructional video**

In instructor-led contexts, the trainer can organize moments of practice and give users feedback on their performances. No such structured support is possible for instructional videos that users can study anytime and anywhere. Designers have, therefore, looked at other ways of supporting task practice. One of the means for doing so is to give users access to a

practice file. This file is sometimes the same as in the instructional videos, enabling the user to replicate the task completion shown there. However, a practice file can also be slightly different and designed to optimize the user's learning from the task experience. In these instances, the practice file tends to be brief so that the user does not need to navigate a long file, and it contains a prototypical instance of what it is that the user needs to change. In this way, the user does not face the additional complexity of having to deal with a slightly variant case.

The important role of practice in learning is widely acknowledged and proven in educational research (e.g., Dunlosky et al., 2013; National Academies of Sciences, 2018). In contrast, software training studies on practice arrangements are few and far between, and it has been found surprisingly difficult to find unequivocal support for an effect of practice on learning in this domain. Empirical studies have found only moderate effects, and these have also varied for the kind of learning outcomes that were measured (e.g., van der Meij, 2018; van der Meij & Dunkel, 2020; van der Meij, Rensink, & van der Meij, 2018). For experimental reasons, these studies did not allow users to look back to the instructional video once they engaged in task practice, which may have severely reduced the effectiveness of the built-in moments of practice. Even with this important limitation, practice was found to support learning.

The designer can invite users to engage in practice immediately after an instructional video on a task or after showing several instructional videos. The first variant is known as a blocked practice schedule, in which all tasks revolve around the same task type (Broadbent et al., 2017). The second variant is known as random or interleaved practice. The task practice in that schedule involves different task types (Rau, Aleven, & Rummel, 2013). Empirical research on motor learning has revealed that a blocked practice schedule is more advantageous for success during training, while interleaved practice is more beneficial for learning after training (Dunlosky et al., 2013). This phenomenon is explained by the contextual interference effect where the added complexity of having to distinguish task types and their solutions, make practice more difficult and learning afterwards higher (Rohrer et al., 2020). Recently, a few empirical studies on the two practice schedules have been conducted for software training (Nuketayeva, 2021; Ragazou & Karasavvidis, 2021; van der Meij & Maseland, 2021). These studies showed that users performed better during practice with a blocked than an interleaved schedule, while no differences between schedules after training were found. Based on these findings, our recommendation for practice in software training is to enable immedate practice after a task video.

## Guideline 11: Occasionally Include Background Music

Two inventory studies on YouTube videos have found that the presence of background music contributed to their popularity (Dascălu et al., 2020; ten Hove & van der Meij, 2015). Background music can have a positive effect on the user's mood, but it can also interfere with learning. Therefore, the music that is selected must both fit the intended emotions and content of the video. Figure 17 shows the guidelines for enhancing mood states in an instructional video.

**11. Occasionally include background music**
- 11.1 Select background music that fits the content of the video

**Figure 17. Guidelines for enhancing mood states in an instructional video**

Surely, filmmakers would not spend millions of dollars if they did not believe in the impact of background music on the movie experience of the audience. One has only to compare the shower scene from Hitchcock's *Psycho* played with or without background music, as demonstrated in the documentary "Score" (Schrader, 2016), to understand the emotional effect of background music on the viewer. Thus, the movie industry may have inspired video designers to include and capitalize on the effect of background music in their instructional videos (Liu & Chen, 2018).

Baddeley's (2007) model of working memory gives a theoretical account of how the brain processes music. Music automatically gains access to working memory via the phonological loop which holds speech-based and acoustic information. According to Baddeley, music can put people in the right mood; it can energize them. However, Baddeley also warns that the inclusion of music may entail risks. Because music and language are both processed in the phonological loop and thus compete for the same space in working memory, music

can supersede the content of a spoken narration and obstruct learning.

It is important to make a distinction between music and background music. There is a considerable body of research on the effects of music before or during task execution. These studies, for example, investigate the effects of music on mood inducement (Putkinen, Makkonen, & Eerola, 2017), exercising (Moss, Enright, & Cushman, 2018), and surgical performance (Fu et al., 2021). In these studies, music plays a primary role in inducing emotions. In contrast, in instructional videos, music plays a secondary role; it supports the content (or should do so). This kind of music is, therefore, called background music (Ansani et al., 2020).

To our knowledge, research on the role of background music in videos is limited and inconclusive. Peters (2021) recently investigated the effects of background music on mood states and learning in a short documentary video on global warming. The participants in the two experimental conditions were exposed to the video with either ominous or uplifting background music while the control group viewed the video without background music. The study expected congruence between the type of background music and the evoked mood states. Only a significant effect of ominous background music on the viewers' negative mood states was found, however. There was no effect of background music on positive mood states or learning. A recent review study likewise concluded that there is inconclusive evidence of a beneficial effect of background music on learning (de la Mora Velasco & Hirumi, 2020). In addition, the study pointed out that there is a dearth of studies on background music in multimedia learning designs.

In view of the above, we concur with the practical advice from Koumi (2016), who proposes to include only background music that fits the content and to present that music sparingly (e.g., at the beginning and end of a video). Koumi carefully documents his advice, stating clearly that background music should never compete with the spoken narration, and therefore, can best be included in scenes where there is no narration at all.

## CONCLUSION & DISCUSSION

The present article has advanced a revised and updated version of the eight design guidelines for the design of instructional videos proposed by van der Meij and van der Meij (2013). The new framework consists of 11 main guidelines, plus numerous detailed underlying guidelines for their construction. Each guideline description starts with an argument for its existence. Also, its theoretical basis is characterized and evidence from empirical research is mentioned.

It should be noted, however, that we have been unable to find empirical studies for some of the guidelines in the framework. This is the case for the main guidelines to support users in finding a suitable instructional video, to use a screencast with narration, and for including four components in presenting procedural discourse. We believe there are good arguments why these guidelines should be adopted in designing instructional videos for software training. These do not constitute empirical proof, however. While it may be hard to obtain such evidence, empirical research on these guidelines can contribute to a better understanding and may reveal whether restricting conditions apply.

Our review of the literature further revealed that sometimes the empirical research did not involve software training but consisted solely of multimedia studies. The most prominent research in the latter field is from Mayer (2014a) who has proposed 12 multimedia principles that have been investigated in numerous empirical studies. While the general findings of these studies are relevant for research on software training, there are also important differences in medium and aims. That is, multimedia research usually does not involve narrated screencasts, and the aim of the instruction is often problem-solving or conceptual knowledge development rather than procedural knowledge development. In short, while the evidence-based multimedia principles may hold for software training, it is necessary to discover whether they can also be found to support software training with instructional videos.

Finally, there are also differences in the strength of the empirical evidence for the guidelines. Some guidelines have received more support than others. For instance, there is substantial proof that the task instructions in a video should be made easy to follow and mimic, and that there should be support for handling the transitory nature of video. In contrast, empirical research is more equivocal for the recommendation to include background music.

## Eleven Guidelines for Designing Instructional Videos

The framework presented in this article concentrates on the delivery of information in instructional videos for software training. The guidelines that were presented constitute only part of what is required in design, however. From start to finish, many more development steps and actions are involved. Design-based research distinguishes between four main phases in design that each require a unique set of activities. The first phase should involve an extensive analysis of the content that is to be presented, along with an inventory of the primary and secondary audience characteristics, and an assessment of the context for learning. Next, there should be prototyping and pilot testing followed by the stages of full-fledged development and evaluation (McKenney & Reeves, 2012). For the specific demands involved in the stepwise development of an instructional video, a recent article by Mogull (2021) provides an excellent overview. The article gives extensive information on how to create a project plan and a storyboard, and for constructing a script that precedes the actual creation of an instructional video. The guidelines from the framework presented in the present article provide complementary information that should prove helpful in creating effective instructional videos.

In summary, the 11 guidelines in the framework offer standard solutions to recurrent design issues. They generally provide sound advice, but this advice should not be adopted blindly. Based on certain audiences, domain or context characteristics, it may be beneficial to divert from the guidelines, and, in such cases, we encourage designers to do so. As one of our reviewers aptly stated: the guidelines should be considered as heuristics rather than standards, allowing for and acknowledging some situational variance.

## REFERENCES


Adesope, O. O., & Nesbit, J. C. (2012). Verbal redundancy in multimedia learning environments: A meta-analysis. *Journal of Educational Psychology, 104*(1), 250–263. doi:10.1037/a0026147

Almeida, J., Leite, N. J., & Torres, R. d. S. (2013). Online video summarization on compressed domain. *Journal of Visual Communication and Image Representation, 24*, 729–738. doi:10.1016/j.jvcir.2012.01.009

Ansani, A., Marin, M., D'Errico, F., & Poggi, I. (2020). How soundtracks shape what we see: Analyzing the influence of music on visual scenes through self-eassessment, eye tracking, and pupillometry. *Frontiers in Education, 11*, Article 2242. doi:10.3389/fpsyg.2020.02242

Baddeley, A. D. (2007). *Working memory: Thought and action*. Oxford, UK: Oxford University Press.

Bandura, A. (1986). *Social foundations of thought and actions: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Brand-Gruwel, S., Wopereis, I., & Vermetten, Y. (2005). Information problem solving by experts and novices: Analysis of a complex cognitive skill. *Computers in Human Behavior, 21*, 487–508. doi:10.1016/j.chb.2004.10.005

Brar, J., & van der Meij, H. (2017). Complex software training: Harnessing and optimizing video instructions. *Computers in Human Behavior, 70*, 1–11. doi:10.1016/j.chb.2017.01.014

Broadbent, D. P., Causer, J., Williams, A. M., & Ford, P. R. (2017). The role of error processing in the contextual interference effect during the training of perceptual-cognitive skills. *Journal of Experimental Psychology: Human Perception and Performance, 43*(7), 1329–1342. doi:10.1037/xhp0000375

Butcher, K. R. (2014). The multimedia principle. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (Vol. 2nd, pp. 174–205). New York. NY: Cambridge University Press.

Carroll, J. M. (Ed.) (1998). *Minimalism beyond the Nurnberg Funnel*. Cambridge, MA: MIT Press.

Castro-Alonso, J. C., Wong, R. M., Adesope, O. O., & Paas, F. (2021). Effectiveness of multimedia pedagogical agents predicted by divers theories: A meta-analysis. *Educational Psychology Review, 33*(3), 989–1015. doi:10.1007/s10648-020-09587-1

Clark, H. H., & Clark, E. V. (1968). Semantic distinctions and memory for complex sentences. *Quarterly Journal of Experimental Psychology, 20*, 129–138.

Clark, R. C., & Mayer, R. E. (2016). *e-Learning and the science of instruction* (4th ed.). Hoboken, NJ: Wiley.

Cockburn, A., Gutwin, C., & Scarr, J. (2014). Supporting novice to expert transition in user interfaces. *ACM Computing Surveys, 47*(2), Article 31, 1–36. doi:10.1145/2659796

Cohn, N., & Foulsham, T. (2020). Zooming in on the cognitive neuroscience of visual narrative. *Brain and Cognition, 146*. doi:10.1016/j.bandc.2020.105634

Cojean, S., & Jamet, E. (2017). Facilitating information-seeking activity in instructional videos: The combined effects of micro- and macroscaffolding. *Computers in Human Behavior, 74*, 294–302. doi:10.1016/j.chb.2017.04.052

Cojean, S., & Jamet, E. (2018). The role of scaffolding in improving information seeking in videos. *Journal of Computer Assisted Learning, 34*(6), 960–969. doi:10.1111/jcal.12303

Cojean, S., & Jamet, E. (2021). Does an interactive table of contents promote learning from videos? A study of consultation strategies and learning outcomes. *British Journal of Educational Technology, 53*(2), 269–285. doi:10.1111/bjet.13164

Craig, S. D., & Schroeder, N. L. (2019). Text-to-speech software and learning: Investigating the relevancy of the voice effect. *Journal of Educational Computing Research, 57*(6), 1534–1548. doi:10.1177/0735633118802877

Cudmore, A., & Slattery, D. M. (2019). An analysis of physical and rhetorical characteristics of videos used to promote technology projects, on the Kickstarter crowdfunding platform. *Technical Communication, 66*(4), 319–346.

Cui, W., Zheng, J., Lewis, B., Vogel, D., & Bi, X. (2019, May 4–9). *HotStrokes: Word-gesture shortcuts on a trackpad* [Paper presentation]. The CHI 2019: Proceedings of the 2019 Conference on Human Factors in Computing Systems, Glasgow, UK.

Dascălu, C. G., Anthone, M. E., Moscalu, M., & Purcărea, V. L. (2020). *Study about the YouTube didactic movies features preferred by students in dental medicine* [Paper presention]. The 16th International Scientific Conference on eLearning and Software for Education, Bucharest, Romania.

Davis, R. O., Vincent, J., & Park, T. (2019). Reconsidering the voice principle with non-native language speakers. *Computers & Education, 140*, 103605. doi:10.1016/j.compedu.2019.103605

de la Mora Velasco, E., & Hirumi, A. (2020). The effects of background music on learning: A systematic review of literature to guide future research and practice. *Educational Technology Research and Development, 68*(6), 2817–2837. doi:10.1007/s11423-020-09783-4

Dugdale, S. (2010). What's your speech rate? Developing a flexible speaking rate. Retrieved January 10, 2022 from https://www.write-out-loud.com/speech-rate.html

Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. *Psychological Science in the Public Interest, 14*(1), 4–58. doi:10.1177/1529100612453266

Eccles, J. S., & Wigfield, A. (2002). Motivation beliefs, values, and goals. *Annual Review of Psychology, 53*(1), 109–132. doi:10.1146/annurev.psych.53.100901.135153

Espino, J. M. S., Artal, C. G., & Betancor, S. M. G. (2021). Video lectures: An analysis of their useful life span and sustainable production. *International Review of Research in Open and Distributed Learning, 22*(3), 99–118.

Farkas, D. K. (1999). The logical and rhetorical construction of procedural discourse. *Technical Communication, 46*, 42–54.

Fishman, E. (2016). How long should your next video be? Retrieved January 10, 2022 from https://wistia.com/learn/marketing/optimal-video-length

FL Studio Guru. (2010, January 14). *Noise reduction with edison* [Video]. YouTube. https://www.youtube.com/watch?v=Z1CyFNoAWZc

Fu, V. X., Oomens, P., Kleinrensink, V. E. E., Sleurink, K. J., Borst, W. M., Wessels, P. E., Jeekel, J. (2021). The effect of preferred music on mental workload and laparoscopic surgical performance in a simulated setting (OPTIMISE): A randomized controlled crossover study. *Surgical Endoscopy, 35*, 5051-5061. doi:10.1007/s00464-020-07987-6

Garrett, N. (2021). Segmentation's failure to improve software video tutorials. *British Journal of Educational Technology, 52*(1), 318–336. doi:10.1111/bjet.13000

Ginns, P., Martin, A. J., & Marsh, H. W. (2013). Designing instructional text in a conversational style: A meta-analysis. *Educational Psychology Review, 25*(4), 445–472. doi:10.1007/s10648-013-9228-0

Grossman, R., Salas, E., Pavlas, D., & Rosen, M. A. (2013). Using instructional features to enhance demonstration-based training in management education. *Academy of Management Learning*

*& Education, 12*(2), 219–243. doi:10.5465/amle.2011.0527

Guo, P. J., Kim, J., & Rubin, R. (2014, March). *How video production affects student engagement: An empirical study of MOOC videos* [Paper presentation]. The L@S '14: Proceedings of the first ACM conference on Learning @ scale conference, Atlanta, GA.

Gurlitt, J., Dummel, S., Schuster, S., & Nückles, M. (2012). Differently structured advance organizers lead to different initial schemata and learning outcomes. *Instructional Science, 40*(2), 351–369. doi:10.1007/s11251-011-9180-7

Huff, M., Meitz, T. G. K., & Papenmeier, F. (2014). Changes in situation models modulate processes of event perception in audiovisual narratives. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 40*(5), 1377–1388. doi:10.1037/a0036780

Huxhold, M., & Luther, A. (2013). *Produkt- und Lernvideos als ideale Ergänzung zur klassischen Dokumentation*. Paper presented at the Tekom, Wiesbaden, Germany.

Johnstone, T., & Scherer, K. R. (2000). Vocal communication of emotion. In M. Lewis & J. Haviland (Eds.), *The handbook of emotion* (pp. 220–235). New York: Guilford.

Jordan, L. (2013, February 7). *Adobe audition cs6 - how to remove noise from a clip* [Video]. YouTube. https://www.youtube.com/watch?v=Y-_JGy6fWeY

Käfer, V., Kulesz, D., & Wagner, S. (2017). What is the best way for developers to learn software tools? *The Art, Science, and Engineering of Programming, 1*(2), Article 17, 11–41.

Kelly, S. L. (2017). First-year students' research challenges: Does watching videos on common struggles affect students' self-efficacy? *Evidence-Based Library and Information Practice, 12*(4), 158–172.

Kim, J., Guo, P. J., Seaton, D. T., Mitros, P., Gajos, K. Z., & Miller, R. C. (2014, March 4–5). *Understanding in-video dropouts and interaction peaks in online lecture videos* [Paper presentation]. The L@S '14: Proceedings of the first ACM conference on Learning @ scale conference, Atlanta, GA.

Kim, J., Nguyen, P., Weir, S., Guo, H. J., Miller, R. C., & Gajos, K. Z. (2014, April 26–May 1). *Crowdsourcing step-by-step information extraction to enhance existing how-to videos.* [Paper presentation]. CHI '14: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Toronto, ON, Canada.

Kokoç, M., Ilgaz, H., & Altun, A. (2020). Effects of sustained attention and video lecture types on learning performances. *Educational Technology Research & Development*, *68*(6), 3015–3039. doi:10.1007/s11423-020-09829-7

Koumi, J. (2013). Pedagogic design guidelines for multimedia materials: A call for collaboration between practitioners and researchers. *Journal of Visual Literacy, 32*(2), 85–114. doi:10.1080/23796529.2013.11674711

Koumi, J. (2016). Tutorial - Pedagogic video design principles. Retrieved January 10, 2022 from https://www.academia.edu/40074782/Pedagogic_Video_Design_Principles

Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication, 50*(1), 46–70. doi:10.1111/j.1460-2466.2000.tb02833.x

Lazonder, A. W. (1994). *Minimalist computer documentation. A study on constructive and corrective skills development* [Doctoral thesis]. University of Twente, Enschede, the Netherlands.

Lazonder, A. W., & van der Meij, H. (1995). Error-information in tutorial documentation: Supporting users' errors to facilitate initial skill learning. *International Journal of Human Computer Studies, 42*, 185–206.

Lippmann, M., Schwartz, N. H., Jacobson, N. G., & Narciss, S. (2019). The concreteness of title affects metacognition and study motivation. *Instructional Science, 47*(3), 257–277. doi:10.1007/s11251-018-9478-9

Liu, C.-L., & Chen, Y.-C. (2018). Background music recommendation based on latent factors and moods. *Knowledge-Based Systems, 159*, 158–170. doi:10.1016/j.knosys.2018.07.001

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal and task motivation. *American Psychologist, 57*(9), 705–717. doi:10.1037//0003-066X.57.9.705

Lowe, R. K., & Boucheix, J. (2016). Principled animation design improves comprehension of

complex dynamics. *Learning and Instruction, 45*, 72–84. doi:10.1016/j.learninstruc.2016.06.005

MagicalFruitTuts. (2013, May 21). *How to improve a low resolution photo* [Video]. YouTube. https://www.youtube.com/watch?v=CzFDKV9FDJg

Mayer, R. E. (1979). Can advance organizers influence meaningful learning? *Review of Educational Research, 49*(2), 371–383.

Mayer, R. E. (2014a). *The Cambridge handbook of multimedia learning* (2nd ed.). New York, NY: Cambridge University Press.

Mayer, R. E. (2014b). Principles based on social cues in multimedia learning: Personalization, voice, image, and embodiment principles. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (2nd ed., pp. 345–368). New York, NY: Cambridge University Press.

Mayer, R. E., & Fiorella, L. (2014). Principles for reducing extraneous processing in multimedia learning: Coherence, signaling, redundancy, spatial contiguity, and temporal contiguity principles. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (Vol. 2nd, pp. 279–315). New York, NY: Cambridge University Press.

Mayer, R. E., & Pilegard, C. (2014). Principles for managing essential processing in multimedia learning: Segmenting, pre-training, and modality principles. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (2nd ed., pp. 316–344). New York, NY: Cambridge University Press.

McKenney, S. E., & Reeves, T. C. (2012). *Conducting educational design research.* London: Routledge.

Mogull, S. A. (2021). Developing technical videos: Genres (or "templates") for video planning, storyboarding, scriptwriting, and production. *Technical Communication, 68*(3), 56–75.

Moss, S. L., Enright, K., & Cushman, S. (2018). The influence of music genre on explosive power, repetitions to failure and mood responses during resistance exercise. *Psychology of Sport & Exercise, 37*, 128–138. doi:10.1016/j.psychsport.2018.05.002

National Academies of Sciences, Engineering, and Medicine. (2018). *How people learn II: Learners, contexts, and cultures*. Washington, DC: The National Academies Press.

Nuketayeva, K. (2021). *Schedule of practice matters. Does it matter for video-based software training?* [Masters thesis]. University of Twente, Enschede, the Netherlands.

Park, B., & Bailey, R. L. (2018). Application of information introduced to dynamic message processing and enjoyment. *Journal of Media Psychology, 30*(4), 196–206. doi:10.1027/1864-1105/a000195

Peters, M. (2021). *The effect of background music in documentaries on viewers' mood states, risk perception and retention of content* [Master thesis]. University of Twente, Enschede, the Netherlands.

Pi, Z., Xu, K., Liu, C., & Yang, J. (2020). Instructor presence in video lectures: Eye gaze matters, but not body orientation. *Computers & Education, 144*. doi:10.1016/j.compedu.2019.103713

Plaisant, C., & Shneiderman, B. (2005). *Show me! Guidelines for recorded demonstration* [Paper presentation]. The 2005 IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC'05), Dallas, Texas. http://www.cs.umd.edu/localphp/hcil/tech-reports-search.php?number=2005-02

Putkinen, V., Makkonen, T., & Eerola, T. (2017). Music-induced positive mood broadens the scope of auditory attention. *Social Cognitive and Affective Neuroscience, 12*(7), 1159–1168. doi:10.1093/scan/nsx038

Ragazou, V., & Karasavvidis, I. (2021). The effects of blocked and massed practice opportunities on learning software applications with video tutorials. *Journal of Computers in Education*, *9*(2), 173–193 doi:10.1007/s40692-021-00198-5

Randhave, G. K., Schachak, A., Courtney, K. L., & Kushniruk, A. (2019). Evaluating a post-implementation electronic medical record training intervention for diabetes management in primary care. *BMJ Health and Care Informatics, 26*(e100086). doi:10.1136/ bmjhci-2019-100086

Rau, M. A., Aleven, V., & Rummel, N. (2013). Interleaved practice in multi-dimensional learning tasks: Which dimension should we interleave? *Learning and Instruction, 23*, 98–114. doi:10.1016/j.learninstruc.2012.07.003

Rey, G. D., Beege, M., Nebel, S., Wirzberger, M., Schmitt, T. H., & Schneider, S. (2019). A meta-analysis of the segmenting effect. *Educational Psychology Review, 31*, 389–419. doi:10.1007/s10648-018-9456-4

## Eleven Guidelines for Designing Instructional Videos


Richter, J., Scheiter, K., & Eitel, A. (2016). Signaling text-picture relations in multimedia learning: A comprehensive meta-analysis. *Educational Research Review, 17*, 19–36. doi:10.1016/j.edurev.2015.12.003

Rohrer, D., Dedrick, R. F., Hartwig, M. K., & Cheung, C.-H. (2020). A randomized controlled trial of interleaved mathematics practice. *Journal of Educational Psychology, 112*(1), 40–52. doi:10.1037/edu0000367

Roohani, A., Jafarpour, A., & Zarei, S. (2015). Effects of visualisation and advance organisers in reading multimedia-based texts. *The Southeast Asia Journal of English Language Studies, 21*(2), 47–62.

Schneider, S., Beege, M., Nebel, S., & Rey, G. D. (2018). A meta-analysis of how signaling affects learning with media. *Educational Research Review, 23*, 1–24. doi:10.1016/j.edurev.2017.11.001

Schrader, M. (2016). *Score: A film music* [documentary].

Shoufan, A. (2019). What motivates university students to like or dislike an educational online video? A sentimental framework. *Computers & Education, 134*, 132–144. doi:10.1016/j.compedu.2019.02.008

Spanjers, I. A. E., van Gog, T., Wouters, P., & van Merriënboer, J. J. G. (2012). Explaining the segmentation effect in learning from animations: The role of pausing and temporal cueing. *Computers & Education, 59*(2), 274–280. doi:10.1016/j.compedu.2011.12.024

Stratvert, K. (n.d.). *How to add chapters to a youtube video* [Video]. YouTube. https://www.youtube.com/watch?v=8OeETNVoO94

ten Hove, P., & van der Meij, H. (2015). Like it or not. What characterizes YouTube's more popular videos? *Technical Communication, 62*(1), 48–62.

Teng, M. F. (2020). Vocabulary learning through videos: Captions, advance-organizer strategy, and their combination. *Computer Assisted Language Learning*. 1–33. doi:10.1080/09588221.2020.1720253

Tversky, B., Bauer-Morrison, J., & Bétrancourt, M. (2002). Animation: Can it facilitate? *International Journal of Human-Computer Studies, 57*(4), 247–262. doi:10.1006/ijhc.2002.1017

van der Meij, H. (2014). Developing and testing a video tutorial for software learning. *Technical Communication, 61*(2), 110–122.

van der Meij, H. (2017). Reviews in instructional video. *Computers & Education, 114*, 164–174. doi:10.1016/j.compedu.2017.07.002

van der Meij, H. (2018). Cognitive and motivational effects of practice with videos for software training. *Technical Communication, 65*(3), 265–279.

van der Meij, H. (2019). Advance organizers in videos for software training of Chinese students. *British Journal of Educational Technology, 50*(3), 1368–1380. doi:10.1111/bjet.12619

van der Meij, H., Blijleven, P., & Jansen, L. (2003). What makes up a procedure? In M. J. Albers & B. Mazur (Eds.), *Content & complexity. Information design in technical communication* (pp. 129–186). Mahwah, NJ: Erlbaum.

van der Meij, H., & Carroll, J. M. (1998). Principles and heuristics for designing minimalist instruction. In J. M. Carroll (Ed.), *Minimalism beyond the Nurnberg Funnel* (pp. 19–53). Cambridge, MA: MIT Press.

van der Meij, H., & Dunkel, P. (2020). Effects of a review video and practice in video-based statistics training. *Computers & Education, 143*. doi:10.1016/j.compedu.2019.103665

van der Meij, H., & Flacke, M. L. (2020). A review on error-inclusive approaches to software documentation and training. *Technical Communication, 67*(1), 83–95.

van der Meij, H., & Gellevij, M. R. M. (2004). The four components of a procedure. *IEEE Transactions on Professional Communication, 47*(1), 5–14. doi:10.1109/TPC.2004.824292

van der Meij, H., & Maseland, J. (2021). Practice schedules in a video-based software training arrangement. *Social Sciences & Humanities Open, 30*(1), 100–133. doi:10.1016/j.ssaho.2021.100133

van der Meij, H., Rensink, I., & van der Meij, J. (2018). Effects of practice with videos for software training. *Computers in Human Behavior, 89*, 439–445. doi:10.1016/j.chb.2017.11.029

van der Meij, H., & van der Meij, J. (2013). Eight guidelines for the design of instructional videos for software training. *Technical Communication, 60*(3), 205–228.

van der Meij, H., & van der Meij, J. (2016a). Demonstration-Based Training (DBT) for the design of a video tutorial for software instructions.

*Instructional Science, 44*, 527–542. doi:10.1007/s11251-016-9394-9

van der Meij, H., & van der Meij, J. (2016b). The effects of reviews in video tutorials. *Journal of Computer Assisted Learning, 32*(4), 332–344. doi:10.1111/jcal.12136

van Gog, T. (2014). The signaling (or cueing) principle in multimedia learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (pp. 263–278). New York, NY: Cambridge University Press.

van Merriënboer, J. J. G., & Kester, L. (2014). The four-component instructional design model: Multimeda principles in environments for complex learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (2nd ed., pp. 104–148). New York, NY: Cambridge University Press.

van Wermeskerken, M., Ravensbergen, S., & van Gog, T. (2018). Effects of instructor presence in video modeling examples on attention and learning. *Computers in Human Behavior, 89*, 430–438. doi:10.1016/j.chb.2017.11.038

Wang, J., Antonenko, P. D., & Dawson, K. (2020). Does visual attention to the instructor in online video affect learning and learner perceptions? An eye-tracking analysis. *Computers & Education, 146*. doi:10.1016/j.compedu.2019.103779

Wang, J., Antonenko, P. D., Keil, A., & Dawson, K. (2020). Converging subjective and psychophysiological measures of cognitive load to study the effects of instructor-present video. *Mind, Brain, and Education, 14*(3), 279–291.

Wilson, K. E., Martinez, M., Mills, C., D'Mello, S., Smilek, D., & Riso, E. F. (2018). Instructor presence effect: Liking does not always lead to learning. *Computers & Education, 122*, 205–220. doi:10.1016/j.compedu.2018.03.011

Wondershare Fimora Video Editor. (2016, September 16). *How to remove background noise from audio/video in filmora* [Video]. YouTube. https://www.youtube.com/watch?v=PC4GRRCQPWE

Yue, C. L., Bjork, E. L., & Bjork, R. A. (2013). Reducing verbal redundancy in multimedia learning: An undesired desirable difficulty? *Journal of Educational Psychology, 105*(2), 266–277. doi:10.1037/a0031971

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# Creating a Model for Developing and Evaluating Technical Instructions that use Extended Reality

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By Satu Rantakokko


## ABSTRACT

**Purpose:** Extended reality (XR) is an umbrella term for the many ways that we can now design 3D, interactive, and real-time environments as in combining virtual and real elements, and experience immersion in a completely virtual reality (VR). The use of XR is increasing in popularity across a range of industries. Although researchers are becoming increasingly interested in the benefits and challenges of using XR to convey technical instructions, more comprehensive research is required. I aim to address this need in the present article by introducing an affordance model of Technical Instructions in Extended Reality, the TIER model.

Two earlier categorizations, the affordances of technical instructions, and the phases of data handling in XR, formed the point of departure for this article. The analysis utilized a four-category model of affordances by Rantakokko and Nuopponen (2019) that comprised: accessing, finding, understanding, and relying on. Data handling in XR drew on a phase-based model by Rantakokko (2022) featuring: collection, processing, storage, transfer, combining, and presentation.

**Methods:** The two sets of categorizations were combined into a holistic model with an iterative process in order to offer a tool for analyzing and describing the possibilities and challenges that XR brings to designing technical instructions. The iterative process was conducted by adding examples from existing research into matrix tables to understand how the affordances of technical instructions and the phases of data handling in XR are connected.

**Results:** The TIER model is introduced with examples to illustrate how it can be used to view every phase of XR data handling in terms of the affordances of technical instructions based on the laws, regulations, principles of good guidance, and the design process.

**Conclusion:** The TIER model can be used as a tool for an organized, step-by-step design process as well as testing XR-based technical instructions to ensure that the features of XR support the intended affordances of technical instructions.


**KEYWORDS:** technical instructions, affordances, extended reality, mixed reality, virtual reality

Satu Rantakokko

**Practitioner's Takeaway:**

- XR offers new possibilities (i.e., interactive, 3D, and real-time instructions) and challenges (i.e., privacy-related challenges) for designing technical instructions.
- More research is needed to fully benefit from the possibilities of various types of XR and avoid or minimize the new risks.
- The affordance model of Technical Instructions in Extended Reality (TIER) model is a tool for organizing the design process of XR-based technical instructions.
- The TIER model also offers an organized means for testing the XR-designed technical instructions.
- Although the TIER model is mainly focused on the perspective of the designers of technical instructions, it can also be used as a research framework.

## INTRODUCTION

For as long as there have been technical devices, there have been instructions on how to use them. These instructions can take many forms, such as face-to-face guidance, paper manuals, online-instructions, videos, audios, pictures, etc., as long as they fulfill their main purpose: to guide users preparing to use or operate a technological product. However, the recurring challenge is how to encourage users to read the instructions they need, especially if they opt to immediately begin to test the technical device. According to Novick and Ward's research (2006), paper manuals were the most rejected form of instructions; it was more common for users to give up on the project rather than use the printed manuals.

Professional communicators have noted this challenge and have searched for novel solutions. One of many such efforts is related to emerging technologies. *Extended reality (XR)* is considered a promising medium for delivering technical instructions and capturing the users' interest. XR is an umbrella term for all the three-dimensional, interactive, and real-time environments with virtual elements (see, e.g., Fast-Berglund, Gong, & Li, 2018, p. 32). It includes *mixed reality (MR)* and *virtual reality (VR)*. Furthermore, mixed reality includes *augmented reality (AR)* and *augmented virtuality (AV)*. These concepts and their relations are illustrated in a reality-virtuality continuum by Rantakokko (2022, adapted from Milgram & Kishino, 1994, p. 1321) in Figure 1.

Actual reality is the natural environment without virtual elements in it. Instead of diving deep in the ever-lasting philosophical debate about the concept of *real*, I quote the Merriam-Webster online dictionary (2022), which defines *real* among other things as "having objective independent existence"; "not artificial, fraudulent, or illusory"; "occurring or existing in actuality"; and "existing as a physical entity and having properties that deviate from an ideal, law, or standard." With these definitions, from the point of view of this research, actual reality can be defined as "the totality of real things that occur or exist in actuality as physical entities which are not artificial, fraudulent, or illusory,

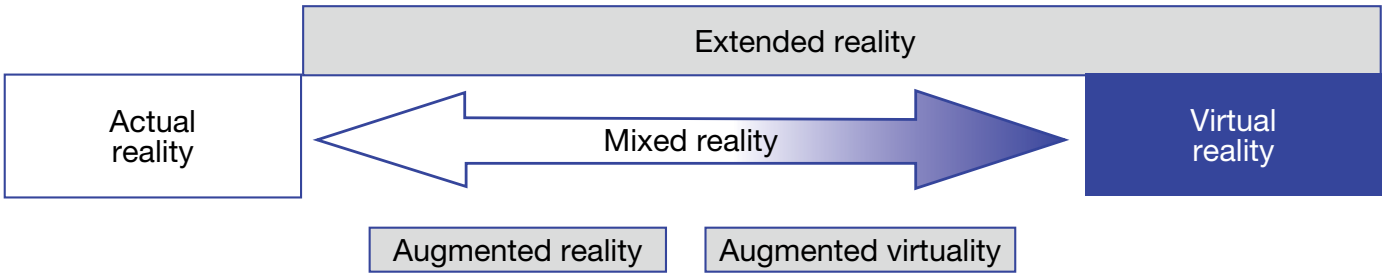


**Figure 1. Reality-virtuality continuum (Rantakokko, 2022)**

and which have objective independent existence." XR breaks the boundaries of the perception of reality. At its best, added virtual elements are detected and experienced in a similar way to real elements. Yet, instead of existing in physical reality, they only exist as virtual enhancements.

VR aims to create a completely artificial, virtual experience with no real elements included. It is useful, for example, for virtual training if skills need to be practiced in a safe environment or with less costs (Hoedt et al., 2017). MR includes both real and virtual elements. In mixed reality, two types can be separated: augmented reality (AR) and augmented virtuality (AV). AR is based on actual reality that is enriched with virtual elements, while AV is based on a virtual environment enriched with real elements (see, e.g., Ternier et al., 2012, p. 2146). AR can be used, for example, to offer phase-by-phase manual assembly instructions, pointing out to the user which component to assemble next (de Amicis et al., 2017). AV enables, for example, distance meetings in a virtual, interactive meeting room so that participants can see each other live while interacting with virtual objects in the meeting room (Regenbrecht et al., 2003).

In previous research, the focus has typically been on a certain type of XR, in relation to a specific task (see, e.g., Albert et al., 2014; Zauner et al., 2003; Doshi et al., 2017). However, often, optimal benefits are achieved when combining different types of XR. Furthermore, it is important to consider the common and general features of XR as a whole to gain an understanding of how this technology works and how it can be utilized to support the features of well-functioning technical instructions. Consequently, there is a need for a comprehensive and more in-depth view on the subject.

Using XR to deliver technical instructions requires new approaches. For example, according to Burova et al. (2020, p. 3), "existing, traditional technical documentation content does not work when viewed with AR glasses." This is due to the fact that there is too much text. This characteristic renders relevant passages difficult to find and understand. Commencing the use of an emerging form of technology as a tool requires careful consideration from the designers of technical instructions to fully utilize its possibilities and to avoid mistakes. More knowledge of the features and nature of XR as a medium are required to understand its benefits as well as possible hindrances and effects. These needs can be addressed with a theoretical model that serves as a tool for the designers of XR-based technical instructions to analyze both the possibilities and challenges posed by using XR. In this article, I propose such a model to extend the discussion of using XR as a tool to deliver technical instructions.

The model I introduce in this article, for the purpose of analysis, is for professionals of technical communication who are planning to use XR as a medium for delivering technical instructions for a target user group. This model offers a comprehensive view on XR as a tool and an organized way to view the design process of XR-based technical instructions.

In general, using XR as a medium to deliver technical instructions offers multiple novel possibilities. Through using XR, technical instructions can be made interactive, context-related, and three-dimensional, and they can also combine multiple virtual elements, such as text, pictures, and videos related to the real environment (Azuma, 1997). This increases the likelihood that the user receives vital information when required. Furthermore, since the instructions are available during the tasks and without interrupting the task-related actions in order to read them, it is more likely that users will actually use the instructions.

On the downside, XR requires certain equipment to function; currently this typically includes headsets or smartphones and tablets as a bare minimum. Despite technological advances in recent years, this equipment still has problems, such as the cumbersome nature of the devices and delays (see, e.g., Aukstakalnis, 2017). Another challenge is that the nature of XR is to constantly collect the data of users and their environment, thus bringing new kinds of cyber security challenges into the field (see, e.g., Piumsomboon et al., 2017, p. 36; Reilly et al., 2014, p. 275; de Guzman, Thilakarathna, & Seneviratne, 2019, pp. 8, 13).

With other media, such as paper manuals, video instructions etc., these challenges have not been significant concerning technical instructions since instructions do not usually include the collection of sensitive and personal data. In the case of XR, the collection of sensitive data is difficult, if not impossible, to avoid, and is thus vulnerable to attack. This risk of attack results from the fact that in order to situate virtual objects in the right place at the right time, XR equipment must track, for example, the user's location,

orientation, gestures, eye movements, and surroundings. XR equipment includes multiple sensors to fulfill these tracking demands (see, i.e., Aukstakalnis, 2017, pp. 20–21). For instance, as de Guzman, Thilakarathna, and Seneviratne (2020, p. 1) mentioned, the requirement of spatial understanding of the user environment leads to spatial maps, which may contain sensitive information that the user did not intend to expose. This sensitive information can be further utilized for unintended functionalities, such as aggressive localized advertisements or even theft. De Guzman et al. (2020) also stated that there are no mechanisms in existing MR platforms that would ensure user spatial data privacy. What makes this issue even more concerning is that this spatial data is perceptually unknown to the users. Instead, they are "oblivious about the captured spatial mapping, its resolution, and exactness" (de Guzman et al., 2020, pp. 1–2).

The affordance model of Technical Instructions in Extended Reality, the TIER model, includes two main elements: technical instructions and XR as the medium delivering them. I will discuss the possibilities and challenges of XR for delivering technical instructions by taking *an affordance model of technical instructions* (Rantakokko & Nuopponen, 2019) and *the phases of data handling in XR* (Rantakokko, 2022) as two essential elements of the TIER model and relating them to each other.

In the TIER model, the affordances of technical instructions are defined by Rantakokko and Nuopponen (2019) as accessing, finding, understanding, and relying on. Further on, the affordances are seen through the levels of rules, design, possibilities, and actualizing. This categorization offers a comprehensive view on technical instructions and the features they should have in order to fulfill their purpose of guiding a user of a technical device. These levels also enable viewing the design process from these main questions: 1) What laws, regulations, and principles are required to construct good guidance? 2) How should ideal technical instructions be designed? 3) How are designed affordances seen by the target user group? and 4) How will or will not these affordances be actualized in real use situations?

In a similar vein, the TIER model starts from the phases of data handling in XR as introduced by Rantakokko (2022): collection, processing, storage, transfer, combining, and presentation. This process-based view on the features of XR increases understanding on how data is handled in XR and how XR works as a medium for technical instructions. It also enables for focus to be placed on the possibilities and challenges that XR offers for technical instructions.

To assist the designers of technical instructions in creating functional XR-based instructions for their target group, these two *essential elements* are combined into a model that serves as a practical tool for the thorough examination and analysis of the possibilities and challenges that XR brings in the process of designing technical instructions. Furthermore, the TIER model offers a way to relate the common and central features of XR to the affordances of technical instructions to gain an organized and comprehensive view on designing XR-based technical instructions. With the help of the TIER model, designers of technical instructions can, for example, deliberate on the most effective way to present instructions to users or consider whether an internet connection would be available at the location in which the instructions are used. If the internet connection is not reliable or always guaranteed, this can disable the affordance of accessing and, therefore, make entire XR-based instructions unusable if the instructions are only made available online.

The structure of this article is as follows. First, I briefly introduce the two previous studies upon which the current research is based. This is in order to explain how the affordances of technical instructions and phases of data handling in XR are understood in this study. Second, I present a methodological process of developing the TIER model. Next, I introduce the TIER model in detail and provide examples of how it can be used. Finally, I discuss the conclusions based on the findings of this research.

## TWO ESSENTIAL ELEMENTS OF THE TIER MODEL

In the field of technical communication, there are many novel solutions for diverse challenges (see, e.g., Jones & Gouge, 2017 about wearable technologies; Tham, 2018 about wearables and IoT). These solutions utilize different technologies, accumulated research, and special knowledge. However, I focus strictly on XR-based technical instructions as well as the possibilities and challenges of XR. In the next two subsections, I introduce two *essential elements* of the TIER model: the

# Creating a Model for Developing and Evaluating Technical Instructions

affordances of technical instructions and the phases of data handling in XR.

## Affordances of Technical Instructions

In this article, I view technical instructions through the concept of affordance. As Treem and Leonardi (2012, p. 46) stated, "[affordance] helps to explain why people using the same technology may engage in similar or disparate communication and work practices." Furthermore, Treem and Leonardi (2012) explained that the concept of affordance is useful in research on relationships between new technologies and social practices. The concept of affordance was coined by Gibson (1979), explaining how animals perceive their environment through uses. For example, rather than a stone itself, a monkey perceives a series of functions that the stone enables (i.e., how the monkey can benefit from the stone and its interaction). Since then, the concept of affordance has been a subject of a wide-ranging discussion and a plethora of research ever since.

In the context of this research, affordances refer to the possible functionalities that objects, such as technical instructions, are designed to possess. Here, I also focus on how these possible functionalities may or may not be perceived, experienced, and actualized for the intended users and potentially unintended parties (e.g., cyber criminals). Furthermore, the affordances can be possible functionalities that are not intentionally designed to be actualized, or are inherent in the functionality, and thus able to be recognized and utilized. Based on the research of Rantakokko and Nuopponen (2019), the affordances of technical instructions are accessing, finding, understanding, and relying on. The tool mediating technical instructions to the user should be capable of delivering the designed affordances.

Based on Lanamäki, Thapa, and Stendal 's (2016, pp. 127–128) suggestion that affordances can be understood from four alternative stances, Rantakokko and Nuopponen (2019) took a broad perspective on the concept of affordance. In their view, each of the affordances of technical instructions can be seen at four levels: *the level of rules*, *the level of design*, *the level of possibilities,* and the *level of actualizing.* These levels are all present and valid at the same time, instead of being alternative, which makes the view broader. The affordances and their levels are illustrated in Figure 2.

The main point of this structure of affordances and their levels is that in order for technical instructions to be *accessed* when needed, they first must be designed and made available to the user. After accessing the instructions, the user should be able to easily *find* the necessary information. *Understanding* the information requires that it is well designed for the user, and it is expressed in an understandable way. To keep using technical instructions and operate based on the information received, the user must be able to *rely on* the instructions (Rantakokko & Nuopponen, 2019, pp. 58–61).

The four levels take the review of affordances deeper. *The level of rules* defines the necessary features that technical instructions should include according to laws, regulations, and principles of good guidance. *The level of design* is the level at which the desired affordances are established in technical instructions for the user from the perspective of the designers of technical instructions and their knowledge about the potential users. *The level of possibilities* focuses on the users and the affordances that the instructions offer for them. Finally, *the level of actualizing* defines actual situations, where affordances either will or will not be actualized.

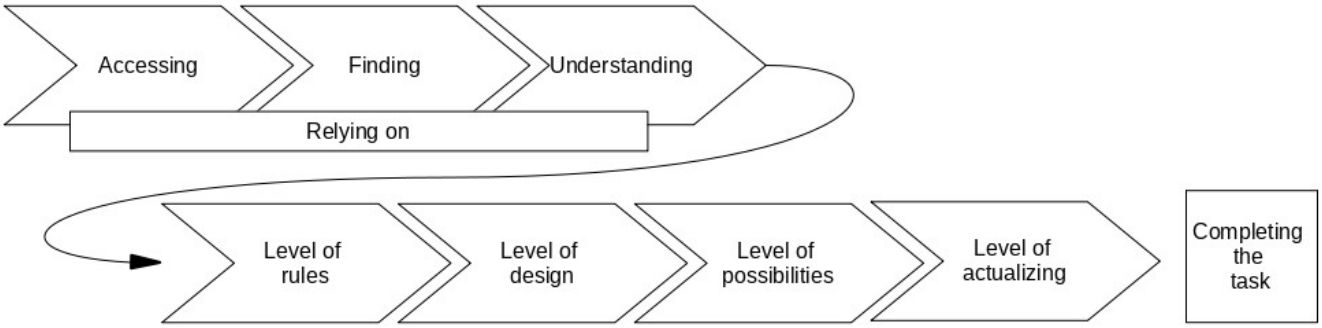


**Figure 2. Rantakokko and Nuopponen's (2019) affordances of technical instructions and their levels**

From the perspective of Rantakokko and Nuopponen (2019), the concept of affordances covers: 1) all the possible functionalities that technical instructions are required to include to fulfill their purpose; 2) all the possible functionalities that may be designed; 3) all the possible functionalities that the users see; and 4) all the possible functionalities that are actualized in real situations.

Rantakokko and Nuopponen's (2019) research is the initial point of departure for this article because it focuses on features of functional technical instructions. It offers a view on the possible functionalities of technical instructions that enable instructions to fulfill their purpose in guiding the use of a technological device. This study focuses on various types of technical instructions that can be delivered via the medium of XR. They can, for example, be assembly instructions, teaching instructions on how to use a technological product, or safety-related instructions of products that include real-time warnings.

### The Phases of Data Handling in Extended Reality (XR)

Data and how it is handled in XR technology can be divided into two types. *Instruction data* refers to the technical instructions delivered by XR. *Collected data* covers the data collected by the XR equipment, i.e., the user's position and location (Rantakokko, 2022). In interactive XR-based instructions, these two types of data need to be combined. This occurs, for example, in order to enable the positioning of virtual elements in the context of the instructions – pinpointing optimal placement regarding the user's position and orientation. As such, there is nothing new in collecting information to design the instructions, but this study's focus on the data that XR equipment, such as VR or AR glasses, collects from the users and their circumstances (personal, environment, context, etc.) is new.

In XR, the data is handled in several phases: collection, processing, storage, transfer, combining, and presentation (Rantakokko, 2022). These phases are illustrated in Figure 3.

Not only must data be *collected* and *processed* in order for XR equipment to operate, but it must also be *stored* somewhere for user access. Furthermore, it must be *transferred* to the user and sometimes for processing and storage as well. Finally, it must be *combined* with other data, such as virtual elements with the real environment, and it must be *presented* to the user. In Figure 3, the *transfer* phase is presented beneath other phases because it can be performed throughout.

Phases of data handling is the second essential element of this study as it offers an organized, process-based view on the features of XR, which enables analyzing them in relation to the features of technical instructions. With this combination, it is possible to analyze and describe the possibilities and challenges that XR brings in the process of designing technical instructions. In the next section, I introduce the methodology I used to combine these *starting points* in order to create the affordance model of Technical Instructions in Extended Reality, the TIER model.

## METHODS

To combine the two essential elements of the TIER model, I followed an iterative process in which the existing empirical examples were placed into matrix tables until a point of saturation had been reached. Table 1 is an example of such a table, focusing on the

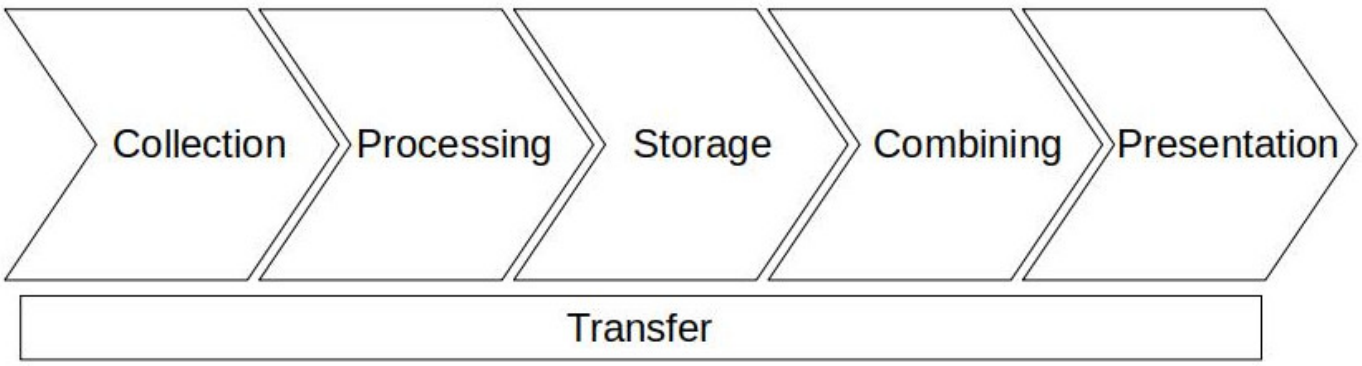


**Figure 3. Phases of data handling in XR**

phase of data collection. The terms used in this table are explained in the Results section, where the complete table establishing the TIER model is introduced. Examples of the benefits are identified as user-friendly effects in Table 1. Table 1 also acknowledges the challenges faced during the data collection phase in XR, including privacy and security issues; these issues were also highlighted in previous research (Rantakokko, 2022).

In all of the matrix tables, like Table 1, the possibilities of XR-based technical instructions were related to the three-dimensional, real-time, and the interactive nature of XR. At the same time, privacy- and security-related issues were considered to be significant challenges due to continuous data collection by the software and devices.

## RESULTS

I developed the TIER model to create a way to analyze the possibilities and challenges that XR as a medium brings to the process of designing technical instructions. The TIER model offers a way to approach this objective by enabling a holistic perspective on the process in two ways. First, the view of the affordances is comprehensive. The four levels of affordances of technical instructions take into account the aspects of rules, design, possibilities, and actualizing. Second, the TIER model views XR as a whole, focusing on the common features rather than differences between its types, such as VR and AR. While the model was constructed on the premise of empirical findings of existing research, the model itself, in its current state, has not yet been applied to further empirical studies.

The TIER model is especially designed for technical communication professionals who are planning to use XR technology in the delivery of technical instructions. The practical benefit of this model is that it offers an organized way to consider both the affordances of technical instructions and the process of XR data handling, phase by phase. Designers of technical instructions may include their own requirements and goals in the matrix, choose one or several types of XR for different tasks, and ensure that all the necessary aspects are taken into consideration. The application of the TIER model can save a lot of time and money while avoiding potential mistakes. As stated, problems that may occur include privacy and security issues that emerge from constant data collection and the lack of user familiarity with the system, such as leakage of passwords or private conversations.

As Burova et al. (2020, p. 2) highlighted in relation to AR-based industrial instructions, "the development of industrial AR solutions should be iterative, with systematic testing, to identify the best strategies of information presentation and interaction for accessing the AR content." Furthermore, Burova et al. (2020, p. 2) stated "errors in design may lead to dramatic consequences." These points are valid for XR-based technical instructions as a whole and highlight the importance of an organized design process.

The basic elements of the TIER model are introduced in Figure 4. The levels of rules, design, possibilities, and actualizing are valid for all the affordances, even though, for clarity, they are listed only via the affordance of accessing.

The process of designing XR-based technical instructions are organized as follows:

1) Appraising valid laws, regulations, and recommendations for the type of instructions with each affordance (the level of rules)—for example, what is required for the instructions to be accessed;
2) Considering all the desired features and the ones that should be prevented, compared to affordances (level of design, focusing on technical instructions)—for example, what kind of safety-related guidelines are needed in the instructions;
3) Comparing the results with the phases of data handling in XR in detail to ensure that each phase

**Table 1. The phase of data collection in XR in relation to the affordances of technical instructions**

| | Accessing | Finding | Understanding | Relying on |
|---|---|---|---|---|
| **User-Friendly Effects** | Warnings of critical situations in a work environment, situation-related instructions | Occurs | Occurs | Adding on safety and the quality of instructions |
| **Privacy and Security Challenges** | Sensitive data concerning the users, their surroundings, and bystanders | Occurs | Occurs | Input sanitization techniques |

supports each affordance (level of design, focusing on XR as a medium for instructions)—for example, how the privacy and security issues are related to accessing data at every phase of the XR data handling; and

4) Testing that the users recognize the affordances present in the design (level of possibilities), and that the affordances can be actualized in real situations (level of actualizing)—for example, do the users understand phase by phase instructions in a maintenance task, and can they perform the task with the instructions.

The levels of possibilities and actualizing require empirical research because these levels are contingent on the users and real use situations. Because this study serves as an introduction to the TIER model. This article focuses on the first two levels of the model—rules and design. Still, the levels of possibilities and actualizing, defined earlier are important.

## General Structure of the TIER Model

The basic structure of the TIER model is presented in Table 2. It is based on the affordances of technical instructions combined with the phases of XR data handling. The affordances of technical instructions (accessing, finding, understanding, and relying on) are listed in the table heading. The phases of the XR data handling (collection, processing, storage, transfer, combining, and presentation) are introduced in the first column of the table. The table relates these aspects to each other by putting each phase of XR data handling in relation to every affordance of technical instructions as well as illustrates the impact that any phase of the XR data handling has on each affordance to being actualized for the users.

The terms used in the table, and how the concepts they represent are related to each other, are as follows:

**Occurs:**
When the affordance first emerges, it is marked as "occurs" in the table. The affordances of accessing, finding, and understanding occur when data is collected. The affordance of accessing also occurs for a new data set in the phase of combining.

**Exists:**
The affordance of relying on is marked as "exists" on every row. This is because the affordance can occur even before the XR-based technical instructions are designed, based on, for example, the users' preconception about the technology of XR. Furthermore, relying on the instructions is a precondition throughout the process in order for the user to use the instructions in the first place. The effects of the phases of the XR data handling can be either positive or negative on the affordance of relying on, but if it does not exist, the technical instructions will probably not be used.

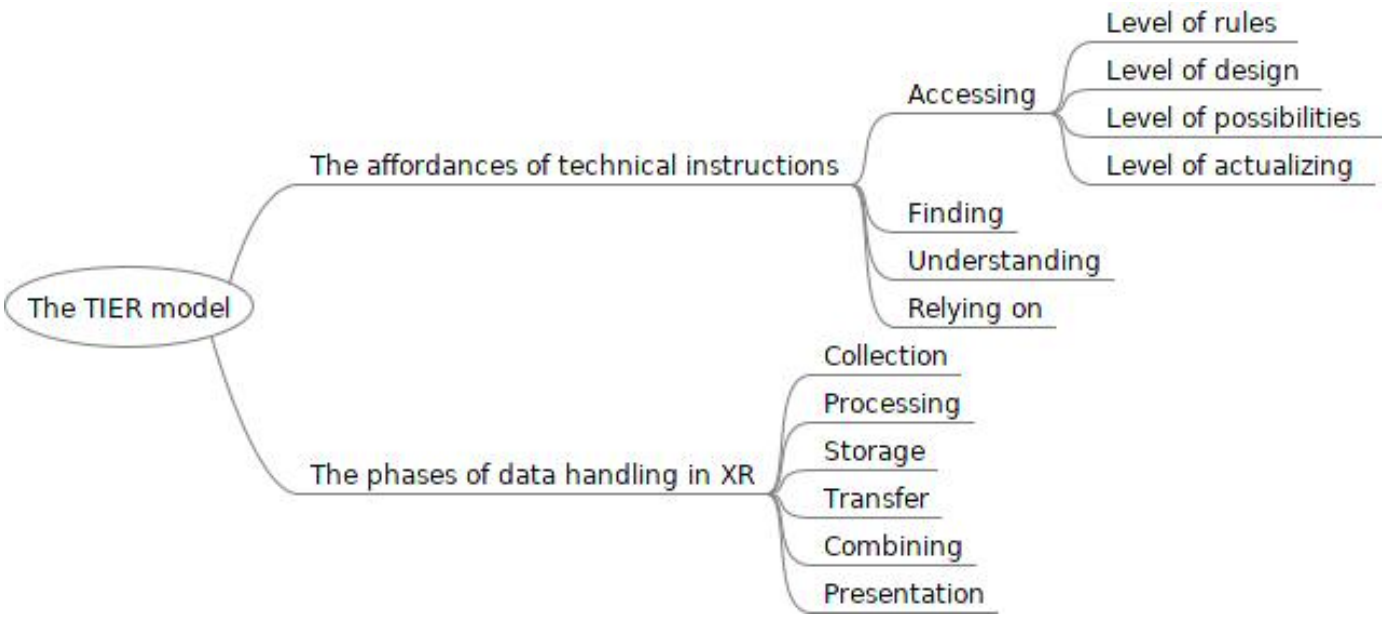


**Figure 4. The basic elements of the TIER model**

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**Improves:**
Some phases improve the probability for the affordance to be actualized. For example, when the data is collected, the affordance of accessing occurs, since, at that very moment, there is data to be accessed. However, for the XR equipment to operate, the data needs to be processed. This makes the affordance of accessing more realistic and even more so in the phase of presentation.

**No effect:**
Affordances of technical instructions, excluding the affordance of relying on, are temporally related to each other. This is because, for example, to be able to find the data in the instructions, the user must have already accessed the technical instructions, and, therefore, data storage has no significant effect on finding the data. Next, I introduce the TIER model in detail and include some examples that focus on the model's first two levels—the level of rules and the level of design.

## Collection Phase of XR Data Handling

The first phase of the XR data handling is data collection. Data collection is an ongoing process because XR equipment needs to constantly collect data about the user and their surroundings to be able to function (see, e.g., Piumsomboon et al., 2017, p. 36; Reilly et al., 2014, p. 275; de Guzman et al., 2019, pp. 8, 13). Table 3 introduces some examples of the various aspects that may be important to consider at this phase. Note: The numbered items within the subsequent tables in this article correspond to the numbered items in the narrative descriptions of the tables.

With the TIER model, this phase can be organized according to the respective levels.

**Level of rules:**

1) Considering the instructions and the target group, according to laws and regulations, what kind of data is allowed to be collected? For example, if the users are wearing the XR equipment, it may record all passersby, including their conversations, without their knowledge or consent awareness of the users or passersby. Or if the users log into an application or computer, their passwords may be recorded.
2) It may also be important to take measures to collect only the necessary and allowed data and solve the challenge regarding what to do with the rest. Furthermore, you may need to take measures to protect the data collected with, for example, input sanitization techniques.

**Table 2. The TIER Model**

| The Phases of the XR Data Handling | The Affordances of Technical Instructions | | | |
|---|---|---|---|---|
| | Accessing | Finding | Understanding | Relying on |
| **Collection** | Occurs | Occurs | Occurs | Exists |
| **Processing** | Improves | Improves | Improves | Exists |
| **Storage** | Improves | No effect | No effect | Exists |
| **Transfer** | Improves | No effect | No effect | Exists |
| **Combining** | Occurs for a new data set | Improves | Improves | Exists |
| **Presentation** | Improves | Improves | Improves | Exists |

**Table 3. Data collection in the TIER model**

| | Accessing | Finding | Understanding | Relying on |
|---|---|---|---|---|
| **Level of rules** | 1. What kinds of data are allowed to be collected? | Occurs | Occurs | 2. How to collect only allowed data and protect it? |
| **Level of design** | 3. What kinds of data need to be collected? | Occurs | Occurs | 4. What kind of equipment can collect the needed data? |

**Level of design:**

3) What kind of data needs to be collected, according to the purpose of the instructions? For example, should you track the user's eye gaze?
4) What kind of equipment can manage the collection of needed data in a reliable way? For example, if eye tracking is needed, which XR headsets enable this?

Regarding the affordance of accessing, data collection is the most important phase of the XR data handling. In order for access to take place, all the necessary data must first be collected. The instruction application could, for example, collect data from safety critical situations in a work environment, such as information regarding increased amounts of radiation or rising heat. In this way, safety-critical data is obtained, saved, and stored for retrieval and review at any time. The affordances of finding and understanding also occur at the phase of XR data handling, but data collection has no significant effect for them. Actions regarding data collection can affect the user's inclination preference to rely on XR-based technical instructions. If the user is, for example, given options to block some data from being collected, it may have a positive effect on relying on the instruction application. Thus, users can trust that not every word they say, every object they look at, or every physical or emotional reaction they have during the work task, is recorded and in the hands of the employer or an unknown outsider.

## Processing Phase of XR Data Handling

After the data has been collected, it is then processed. This is vital for delivering outputs accurately, interactively, and in real-time, as de Guzman et al. (2019, p. 15) explained. Therefore, processing the data makes the affordance of accessing more realistic. In Table 4, there are some examples of considerations of this phase of XR data handling.

**Level of rules:**

1) According to laws and regulations, who is allowed to have access to data during processing? For example, if the data is processed on the servers of a third party.
2) Balancing with the guidance of good instructions and the limited space. For example, deciding which number of virtual elements is ideal without risking blocking the users' view of important objects in their environment, so that everything needed is easy to find.
3) Balancing the most easily understood objects with the required processing capacity of the equipment. For example, deciding on acceptable video quality so that the equipment can process data efficiently.
4) To make the XR-based instructions reliable for the users—how can it be ensured that processing the data is not too slow, causing delays? For example, does the equipment have enough processing capacity for the instructions designed?

**Level of design:**

5) What kinds of virtual objects are needed to be accessed by the users during the task at hand? For example, do they need real-time and interactive recognition of different parts of the technical device?
6) In which places can virtual objects be easily found? If real-time recognition of different parts is needed, how can they be situated in the user's view? Should the XR-based instructions recognize and point out the parts themselves, or would the recognition process demand the user to isolate and show different parts for them to be recognized? The latter could cause longer assembly processes and frustration, while the first could be less accurate.
7) How can understanding be supported in relation to data processing? For example, how could it be

**Table 4. Data processing in the TIER model**

| | Accessing | Finding | Understanding | Relying on |
|---|---|---|---|---|
| **Level of rules** | 1. Who can be given direct access to data during processing? | 2. How can information be made easy to find? | 3. How can instructions be designed so that they are easy to understand? | 4. How can data processing be made fluent? |
| **Level of design** | 5. What kind of virtual objects are needed to be accessed? | 6. Where should those virtual elements be situated? | 7. How can understanding be supported? | 8. Where should the data be processed? |

ensured that the objects are presented in the right place and at the right time? Delays could mean that the application indicates the wrong part, which would make understanding difficult.

8) Considering the amount of data and the purpose, is it more reliable to process the data with the equipment or transfer it elsewhere to be processed? For example, is there too much data for the equipment to process, and if sent elsewhere, is the connection guaranteed?

The phase of data processing is a vital enabler of the possibilities of XR delivering technical instructions. This phase raises questions about what kinds of data are needed to be processed in order to make the desired functionalities possible and how this data can be balanced with limitations of the equipment. This matter has an effect on all the affordances. There may be a need to return to this phase during designing the phase of data presentation to ensure that the designed elements and the realities of processing support each other.

## Storage Phase of XR Data Handling

The collected and processed data may be stored (see, e.g., Schmalstieg & Höllerer, 2016, p. 3). The phase of data storage allows for continuity; the instruction data and the relevant collected data are preserved for future needs. In Table 5, there are some examples of the issues to be considered at this phase of XR data handling.

**Level of rules:**

1) According to laws and regulations, what kinds of data are allowed to be stored? Often, unnecessary data about the users and their surroundings is forbidden to be stored.
2) How should the data be protected while it is stored to deny access from unauthorized parties? The data stored is vulnerable for attacks, and therefore, measures for protection are important to consider.

**Level of design:**

3) According to purpose, what kinds of data need to be stored? For example, the data collected when the XR equipment was used can include conversations. Some conversations could be necessary to store, such as direct instructions for a specific task, but some could be private or unnecessary.
4) Where should the data be stored? If there is a need for data storage solutions by a third party, it is important to consider that this party is reliable and has good protection for the data stored.

The phase of data storage is important for the continuity of using the instructions. Data storage provides an opportunity for access to the needed data whenever it is required. It, therefore, improves the possibility of the affordance of accessing to be actualized. This phase has no significant effect on the affordances of finding and understanding. However, for the affordance of relying on, it is important to take measures to protect the data and decide where to store it. If the users are not aware of what data related to them is stored and where, it could reduce their reliance on the XR-based instructions.

## Transfer Phase of XR Data Handling

Data transfer may be needed for the purposes of processing or storage of the data. It is also needed for collaboration, for example, when using distant guidance via XR equipment (see, e.g., Reilly et al., 2014, p. 275; de Guzman et al., 2019, p. 30). Some examples are introduced in Table 6 to demonstrate how to use the TIER model in this phase of XR data handling.

**Level of rules:**

1) What instructions are required by laws and regulations to be available to the users at all times? For example, safety-related instructions are usually required.
2) How to make sure that the instructions are available when needed? For example, which instructions can

**Table 5. Data storage in the TIER model**

| | Accessing | Finding | Understanding | Relying on |
|---|---|---|---|---|
| **Level of rules** | 1. What kinds of data are allowed to be stored? | No effect | No effect | 2. How should the data be protected? |
| **Level of design** | 3. What kinds of data need to be stored? | No effect | No effect | 4. Where should the data be stored? |

be guaranteed via real-time data transfer only, and which instructions should be available despite the success of internet connection?

**Level of design:**

3) For what purpose is data transfer needed? For example, data processing and storage, or for collaborative use.
4) How can the risk of interruptions and failures be minimized during data transfer? For instance, protecting data transfer, using encrypting, etc.

Data transfer enables the processing and storage of the data in another location and collaboration in XR environments. At this phase, all needs for data transfer should be identified. Data transfer can improve the possibility of accessing the instructions by, for example, enabling distant guidance via XR equipment. However, if a good connection cannot be guaranteed at the location, XR-based instructions should be available offline as well. Transfer has no significant effect on the affordances of finding and understanding the data. When it comes to the affordance of relying on, fluently working instructions that are available when needed can enhance the affordance of relying on.

## Combining Phase of XR Data Handling

Combining data is important for the basic functions of XR. The user's environment, location, position, and movements need to be combined without too much delay with virtual elements in order to enable the XR-based instructions to assist the user in a real-time and interactive manner (see, e.g., Graig, 2013, pp. 51–52). Data combining enables situation-related instructions by recognizing important objects in the user's environment and combining them with instructions on how to use these objects. These are new possibilities that other formats of technical instructions cannot offer. Therefore, there is a delay in laws, regulations, and guidance in relation to the evolving situation. Some examples of considerations at this phase of XR data handling are presented in Table 7.

**Level of rules:**

1) Data combining reopens the questions about data collection—after combining data, are there now new kinds of data sets that would not be allowed to be collected? For example, if it is necessary to measure the users' physical reactions to make sure they are not endangered in challenging conditions, and their eye gaze is measured as well, can there be a new set of data that reveals their reactions or emotions?

**Table. 6 Data transfer in the TIER model**

| | Accessing | Finding | Understanding | Relying on |
|---|---|---|---|---|
| **Level of rules** | 1. What instructions are required to be available at all times? | No effect | No effect | 2. How to ensure that the necessary instructions are available, even if the connection fails? |
| **Level of design** | 3. For what purpose is transfer needed? | No effect | No effect | 4. How to minimize the risk of interruptions and failures during the data transfer? |

**Table 7. Data combining in the TIER model**

| | Accessing | Finding | Understanding | Relying on |
|---|---|---|---|---|
| **Level of rules** | 1. Is there access to new kinds of data sets that would not be allowed or recommended to be collected? | 2. How can sensitive data be made difficult to find for unauthorized parties? | 3. How can sensitive data be made difficult to understand for unauthorized parties? | 4. Making sure that the users are aware of all kinds of data that is collected about them and how it is used |
| **Level of design** | 5. What kinds of data sets need to be combined? | 6. How can findability be increased through combining data? | 7. How can understanding be increased through combining data? | 8. Balancing benefits and risks |

# Creating a Model for Developing and Evaluating Technical Instructions

2) How can sensitive data be made difficult to find for unauthorized parties? For example, XR equipment helps to prevent passersby from seeing log-in information when it is shown only with the device the user is wearing.
3) How can sensitive data be made difficult to understand for unauthorized parties? For example, encryption technologies could help to protect data even if an unauthorized party obtains access to it.
4) Informing users of all the central aspects concerning data combining and collection, such as what is collected and what kind of data sets can be formed with combining data, where is it stored, who has access to it, and how is it used, can enhance the possibility of relying on the XR as a medium for technical instructions.

**Level of design:**

5) What kind of data sets need to be combined for the user to access? For example, rising heat in the work conditions and possible actions that the user should take if this happens.
6) How can the instructions needed be rendered most easy to find with the help of data combining? For example, would tracking the user's eye movements help situate the data needed at the ideal spot?
7) How can data combining improve understanding? For example, would adding a virtual color-coding help realize the structure of a complicated technical device?
8) How can the risks and benefits of data combining be balanced? For example, combining data can add to accessing, finding, and understanding, but it can also add to the risks of private and sensitive data ending up in wrong hands.

Data combining enables and supports some of the most significant possibilities that XR can offer. At the same time, there is a risk with its ability to combine sensitive data to gain more knowledge about the user, an organization, or a bystander. It is important to give deep consideration of data collection from the aspect of data combining to make sure that there will not be any surprises regarding what kinds of leaked information data combining could lead to. Lastly, data combining influences every affordance.

## Presentation Phase of XR Data Handling

Finally, the data is presented to the users, and the possibilities that all the previous phases offered become visible to the users (see, e.g., de Guzman et al., 2019, p. 18). The phase of data processing is also important to consider when designing data presentation. For example, it is relevant to realize the processing power of the equipment used and the possibilities and limitations to determine if there is a need for compromises in relation to what is desired in the phase of presentation. For instance, would increased privacy and security measures mean decreased exactness regarding the informational content and accuracy of the instructions? It is important to notice, that unlike any other instruction format, XR-based instructions can cause safety risks by blocking the users' view and thus making it impossible for them to see relevant objects from their environment. However, XR can decrease the risks by carefully designing the presentation to assist the user in noticing situations in their outside environment that need attention, such as rising heat in the device they are using or poor air quality. This highlights the importance of a carefully designed data presentation and the importance of how XR-based instructions differ from

**Table 8. Data presentation in the TIER model**

| | Accessing | Finding | Understanding | Relying on |
|---|---|---|---|---|
| **Level of rules** | 1. How can it be ensured that instructions can be accessed at all times? | 2. How can it be ensured that the user will not be overloaded with too much data causing risks? | 3. How can sensory overload be avoided? | 4. How can the data presentation from hostile parties be prevented in order to keep it reliable? |
| **Level of design** | 5. How to make instructions be made easy to access in all use cases? | 6. How can instructions be made easy to find? | 7. How can instructions be made easy to understand? | 8. How can functional and uninterrupted presentation be guaranteed? |

other instructional formats. Table 8 introduces examples of the considerations on the data presentation phase.

**Level of rules:**

1) How can access to the required instructions be ensured at all times? For example, making sure that the safety-related warnings are always available even if the connection fails.
2) Considering the nature of XR equipment, can the instructions be created in a non-disturbing way, while still making them easy to find? For example, avoiding long texts and blinking images.
3) How can sensory overload that could diminish understanding be avoided? For example, avoiding the use of many restless elements which can cause fatigue to the user's eyes.
4) How can the data presentation be protected from hostile parties in order to maintain reliability? For example, if the data is attacked at any point of XR data handling, the presentation could be rendered unreliable.

**Level of design:**

5) How can it be ensured that the needed instructions are easy to access at all times? For example, that the selected equipment is not only suitable for the work conditions, but also comfortable to use.
6) How can the instructions be made easy to find? For example, would visual, auditory, or tactile effects be most effective for the user to notice safety-related warnings most accurately, or possibly a combination of them?
7) What is the most understandable way to guide the user through the task at hand? For example, text, symbols, videos, etc.
8) How can the data presentation be made functional and uninterrupted? For example, designing instructions for different work phases to be activated when they are needed.

Data presentation is the visible part of technical instructions to the user. Well-functioning instructions give the needed data at the right time, but do not overload the user with unimportant data, blocking their view, or demanding their attention, unless it is absolutely crucial. Presentation makes accessing the instructions easy and realistic for the user. Well-designed presentation also has a significant effect on finding and understanding the instructions. Fluent, functional, and uninterrupted presentation of the instructions enhances the chances that a user can actually rely on them.

## CONCLUSIONS

In this article, I have introduced the TIER model, a tool that helps analyze the possibilities and challenges that XR brings to designing technical instructions. I introduced this model at a general and theoretical level with the help of examples of what to consider at each phase of the data handling in XR and in relation to every affordance.

I formed the TIER model by combining the two *essential elements of the TIER model*—the affordances of technical instructions and the phases of data handling in XR. I focused on the TIER model's first two levels, level of rules and level of design, out of its four. However, the TIER model's remaining two levels, level of possibilities and the level of actualizing, are important when testing the instructions to see which affordances the users notice and if the affordances are actualized in real use situations. This helps to improve the instructions designed, if needed.

The TIER model aims to benefit the designers of XR-based technical instructions by offering a tool for an organized design process that focuses both on the well-functioning technical instructions and the possibilities and challenges of XR as a medium for the instructions. By making sure that all the necessary aspects are taken into consideration, crucial mistakes and wasted resources could be spared. The strength of the TIER model is its versatility. It can be used to design the instructions as well as testing them, and in addition to the holistic view in XR, it can be used to view the details of different forms of XR related to technical instructions as well. To my knowledge, there are no other models that combine technical instructions and XR to increase the understanding of XR for mediating technical instructions. However, as XR becomes more common due to technological advances and reductions in cost, it is important for technical communicators to conduct more research in this area.

There are some limitations in this research. At this point, it covers only the levels of rules and design, and is, so far, only theoretical. It is yet to be tested with empirical research. However, the concept of affordance is based on the idea that the users can see and act on

various possible functionalities in the objects, despite of what they are planned for. This requires empirical studies that focus on the levels of possibilities and actualizing, making it important to test the TIER model in real design processes of technical instructions. It would also be fruitful to undertake studies of the effects of XR-based technical instructions, conducted with different methods but keeping a wide perspective of XR as a whole.

Many challenges, such as privacy and security risks, can be minimized by taking action during the early stages of XR-based technical instruction development. There are signs that privacy and security issues will increase in the future, when the technology becomes more ubiquitous and widespread, and these issues may be exacerbated with AI or data mining. Thus, more research is needed on the issues of privacy and security.

Furthermore, to fulfill its purpose in guiding technical communication professionals who plan to use XR as a tool to deliver technical instructions, research comparing different kinds of solutions and technologies with their benefits and deficits is needed.

## REFERENCES

Albert, A., Hallowell, M. R., Kleiner, B., Chen, A., & Golparvar-Fard, M. (2014). Enhancing construction hazard recognition with high-fidelity augmented virtuality. *Journal of Construction Engineering and Management*, *140*(7). doi: 10.1061/(ASCE)CO.1943-7862.0000860

Aukstakalnis, S. (2017). *Practical augmented reality: A guide to the technologies, applications, and human factors for AR and VR*. Boston: Addison-Wesley.

Azuma, R. (1997). A survey of augmented reality. *Presence: Teleoperators and Virtual Environments*, *6*(4), 335–385. https://www.cs.unc.edu/~azuma/ARpresence.pdf

Burova, A., Mäkelä, J., Hakulinen, J., Keskinen, T., Heinonen, H., Siltanen, S., & Turunen, M. (2020). Utilizing VR and gaze tracking to develop AR solutions for industrial maintenance. *CHI '20: Proceedings of the 2020 CHI Conference on Human Factors in Computing System,* pp. 1–13. doi: 10.1145/3313831.3376405

de Amicis, R., Ceruti, A., Francia, D., Frizziero, L., & Simões, B. (2017). Augmented reality for virtual user manual. *International Journal on Interactive Design and Manufacturing (IJIDeM)*, *12*(2), 689–697. doi: 10.1007/s12008-017-0451-7

De Guzman, J. A., Thilakarathna, K., & Seneviratne, A. (2019). Security and privacy approaches in mixed reality: A literature survey. *ACM Computing Surveys*, *52*(6), article 110, 1–37. doi: 10.1145/3359626

De Guzman, J. A., Thilakarathna, K., & Seneviratne, A. (2020). Conservative plane releasing for spatial privacy protection in mixed reality. *Cornell University*. arXiv:2004.08029

Doshi, A., Smith, R. T., Thomas, B. H., & Bouras, C. (2017). Use of projector based augmented reality to improve manual spot-welding precision and accuracy for automotive manufacturing. *The International Journal of Advanced Manufacturing Technology*, *89*(5–8), 1279–1293. doi: 10.1007/s00170-016-9164-5

Fast-Berglund, Å., Gong, L., & Li, D. (2018). Testing and validating extended reality (XR) technologies in manufacturing. *Procedia Manufacturing*, *25*, 31–38. https://doi.org/10.1016/j.promfg.2018.06.054

Gibson, J. J. (1979). *The ecological approach to visual perception*. Boston: Houghton-Mifflin.

Graig, A. B. (2013). *Understanding augmented reality: Concepts and applications*. Amsterdam: Morgan Kaufmann.

Hoedt, S., Clayes, A., van Landeghem, H., & Cottyn, J. (2017). The evaluation of an elementary virtual training system for manual assembly. *International Journal of Production Research*, *55*(24), 7496–7508. doi: 10.1080/00207543.2017.1374572

Jones, J., & Gouge, C. C. (2017). Guest editors' introduction wearable technologies and communication design. *Communication Design Quarterly, 5*(4), 4–14. https://doi.org/10.1145/3188387.3188388

Lanamäki, A., Thapa, D., & Stendal, K. (2016). When is an affordance? Outlining four stances. In L., Kavanagh D., Kelly S., Orlikowski W., Scott S. (Eds.). *Beyond Interpretivism? New Encounters with Technology and Organization. IFIP Advances in Information and Communication Technology*, *489*, 125–139, doi: 10.1007/978-3-319-49733-4_8

Merriam-Webster Dictionary (2022). https://www.merriam-webster.com/dictionary/real

Milgram, P., & Kishino, F. (1994). A taxonomy of mixed reality visual displays. *IEICE Transactions on Information and Systems*, *E77-D* (12),

1321–1329. https://search.ieice.org/bin/summary.php?id=e77-d_12_1321

Novick, D. G., & Ward, K. (2006). Why don't people read the manual? *Departmental Papers (CS)*. Paper 15. https://digitalcommons.utep.edu/cs_papers/15

Piumsomboon, T., Lee, G., Lindeman, R. W., & Billinghurst, M. (2017). Exploring natural eye-gaze-based interaction for immersive virtual reality. *IEEE Symposium on 3D User Interfaces (3DUI),* 36–39. doi: 10.1109/3DUI.2017.7893315

Rantakokko, S. (2022). Data handling process in extended reality (XR) when delivering technical instructions. *Technical Communication,* 69 (2) 75–96. doi: 10.55177/tc734125

Rantakokko, S., & Nuopponen, A. (2019). Laajennetun todellisuuden tarjoumat tekniselle viestinnälle – kohti teoreettista mallia. *VAKKI Publications*, *10*, 53–66. http://www.vakki.net/publications/2019/VAKKI2019_Rantakokko&Nuopponen.pdf

Regenbrecht, H., Ott, C., Wagner, M., Lum, T., Kohler, P., Wilke, W., & Mueller, E. (2003). An augmented virtuality approach to 3D videoconferencing. *The Second IEEE and ACM International Symposium on Mixed and Augmented reality, 2003. Proceedings*, pp. 290–291. https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1240725

Reilly, D., Salimian, M., MacKay, B., Mathiasen, N., Edwards, W. K., & Franz, J. (2014). SecSpace: Prototyping usable privacy and security for mixed reality collaborative environments. *EICS '14: Proceedings of the 2014 ACM SIGCHI symposium on Engineering interactive computing systems*, 273–282. doi: 10.1145/2607023.2607039

Schmalstieg, D., & Höllerer, T. (2016). *Augmented reality: Principles and practice*. Addison-Wesley.

Ternier, S., Klemke, R., Kalz, M., van Ulzen, P., & Specht, M. (2012). ARLearn: Augmented reality meets augmented virtuality. *Journal of Universal Computer Science*, *18*(15), 2043–2164. http://www.jucs.org/jucs_18_15/ARLearn_augmented_reality_meets/jucs_18_15_2143_2164_ternier.pdf

Tham, J. C. K. (2018). Interactivity in an age of immersive media: Seven dimensions for wearable technology, internet of things, and technical communication. *Technical Communication*, *65*(1), 46–65. https://www.ingentaconnect.com/content/stc/tc/2018/00000065/00000001/art00006

Treem, J. W., & Leonardi, P. M. (2012). Social media use in organizations: Exploring the affordances of visibility, editability, persistence, and association. *Communication Yearbook*, *36*(1), 143–189. https://doi.org/10.1080/23808985.2013.11679130

Zauner, J., Haller, M., Brandl, A., & Hartman, W. (2003). Authoring of a mixed reality assembly instructor for hierarchical structures. *The Second IEEE and ACM International Symposium on Mixed and Augmented Reality, 2003. Proceedings,* 237–246. doi: 10.1109/ISMAR.2003.1240707

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# Countering Dominant Narratives in Public Memory

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By April L. O'Brien and Josephine Walwema


## Abstract

**Purpose**: State historical commissions tend to avoid erecting historical marker texts (HMTs), memorials, or monuments that document violence towards Black and brown individuals. The Equal Justice Initiative (EJI) uses a series of tactics to circumvent local historical commissions to memorialize victims of lynching.

**Methods**: In this study, we use the EJI's *Community Remembrance Project* (CRP), an informational handbook for community activists, as our data set. We apply the 4Rs (Walton, Moore, & Jones, 2019) and tactical technical communication in our analysis of the *Community Remembrance Project* and argue that the document functions as a coalitional, truth-telling tactic to redress inequalities in public memory.

**Results:** We found that the EJI's CRP efforts with the Historical Marker Project clearly demonstrate how coalitions can tactically intervene in racist systems—like historical commissions that reject truth-telling efforts—by creating a different path for historical markers to be erected in communities.

**Conclusion**: We argue that public memory texts often reinforce racism by avoiding topics like racial terror lynching and that these omissions have cultural and material consequences on communities. We contend that technical communicators can intervene in public memory systems and promote truth-telling through coalitional approaches to community activism.


**Keywords**: social justice, public memory, historical marker texts, informational texts, history

## Practitioner's Takeaway:

Based on this study, practitioners can consider:

- The ways that texts and institutions can marginalize groups of individuals.
- How technical communicators are active producers of information.
- Possibilities and opportunities for using tactical technical communication and community coalitions to create equitable documents.

April L. O'Brien and Josephine Walwema

## INTRODUCTION

On April 26, 2018, the Equal Justice Initiative (EJI), a human rights organization, opened its doors to the National Memorial for Peace and Justice (NMPJ) in Montgomery, Alabama, a memorial built to honor the more than 4,400 Black people who were lynched in the United States between 1877 and 1950. Modeled after the Holocaust Memorial in Berlin and the Apartheid Museum in Johannesburg, the memorial consciously documents a violent aspect of U.S. history that has been either minimized or erased from public memory. Prior to the erection of the NMPJ, there were no significant sites to memorialize this inhumanity. Bryan Stevenson, executive director of EJI, explained that visitors must "see the names of all these people [who have] never been named in public" (as cited in Robertson). These names of individuals who were lynched are engraved on Corten steel columns, which are suspended from the ceiling. The columns, as Robertson (2018) observes, "meet you first at eye level, like the headstones that lynching victims were rarely given . . . by the end, the columns are all dangling above, leaving you in the position of the callous spectators in old photographs of public lynchings" (para 4). Each column includes the dates along with the sites (counties and states) and names (if known) of the lynched (see Figure 1).

Outside, on what is known as the "memory bank" lie duplicates of monuments. EJI incorporated the duplicate monuments with the intention that counties would ". . . engage in this process of acknowledgment and reconciliation by claiming their monument and placing it as a marker in their own community" (MASS Design Group, n.d.). In collaboration with activists, EJI provides funding and instructions to interested parties to build historical marker texts (HMT) without requiring the approval of state or county historical agencies. In Texas, for example, county-level historical commissioners are elected to office. Montgomery County, a highly

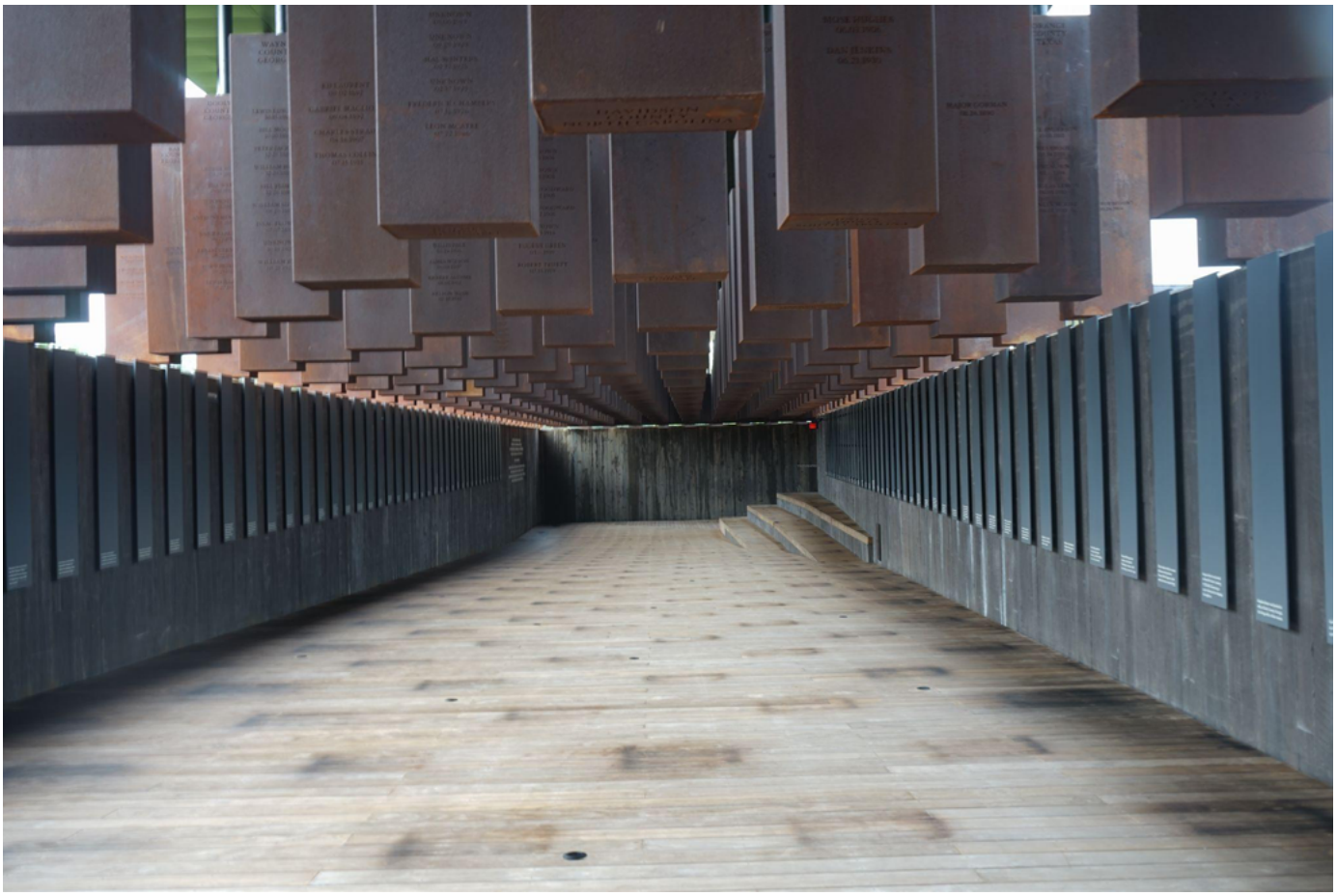

**Figure 1. Hanging monuments at the NMPJ**

populated, Republican-dominated County located just north of Houston, Texas elects a County Judge, who also becomes the leader of the county's historical commission. The other commissioners are not elected because of their historical knowledge but because of their political power (O'Brien, 2021, p. 6). In this article, we examine the HMT work of the EJI as tactical technical communication. We argue that EJI's actions of memorializing lynched victims is a tactic that circumvents local historical commissions, which predominantly tend to avoid erecting HMTs, memorials, or monuments that document violence towards Black and brown individuals.

From the outset, we note that this article is not just about HMTs. It is also about the trauma and violence visited upon Black Americans during a period of intense racial terror. Moreover, given that various forms of racial terror are still inflicted on Black Americans in very public ways as seen in the killings of George Floyd, Fernando Castille, and too many others, this work has the capacity to be triggering to readers. Indeed, Ore (2019) who has examined "lynching as a racialized practice of civic engagement" rooted in anti-Blackness (p. 11), observes that lynching in the 21st century has transformed to "maintain the racial status quo through its denial of due process of law" (p. 19). We further acknowledge that while truth telling has been embraced in the aftermath of atrocities as vital for countering silence and even creating discursive space for addressing past injustices, the risk associated with unearthing atrocities and thus "compelling" individuals to relive those atrocities still abides (see Brounéus, 2010 study of Rwanda; Morris, 2011 on South Africa's TRC). Both studies, which focus on trials, found that individuals who were called as witnesses suffered a high level of PTSD from having to recall those details. Thus, we defer to Bryan Stevenson (2018), who wishes that "truth and justice work become local and that every community that has witnessed the horror of lynching reckons with that history through memorialization," (para 2).

## WHAT ARE HISTORICAL MARKER TEXTS?

HMTs, also known as roadside markers or subject markers, are standalone plaques or stone markers inscribed with text. They are typically installed by state historical commissions at sites that are considered to be historically significant. As informational texts, their primary purpose is to legitimize a (historical) reality to readers quickly and efficiently. And yet, for the most part, HMTs remain an underrecognized area of study in TPC, perhaps owing to their relatively modest size and aesthetic nature—especially compared to more impressive monuments and memorials (Alderman, 2012, p. 358). This article seeks to amplify HMTs as brief, public-facing informational reports and to legitimize the study of public memory documents within TPC. HMTs are, however, bound up within this nation's racist history.

Scholars and activists from a variety of fields, including cultural geography, history, and rhetoric have explored how race and racism impact the creation and circulation of historical tours, monuments, memorials, and HMTs (Alderman, 2012; Bright et al., 2020; Dickinson et al., 2010; Loewen, 1999; O'Brien & Sanchez, 2021; O'Brien, 2018, 2021; Poirot & Watson, 2015; Sanchez & Moore, 2015; Tell, 2019). HMTs are properties of state and local governments, which go to great lengths to protect them by law (Alderman, 2012; Price, 2002). Removing or revisiting such markers can be met with formidable resistance (examples include attempts to revisit the 2015 *Greensboro Massacre* and The Georgia Historical Society's 2015 correction of the *Lost Cause* narrative). Most attempts at dialogue have failed to change minds. In addition, the lack of diversity on many local and state-level historical commissions, as well as exclusionary HMT application instructions, shape which topics are approved. Consequently, HMTs often do not communicate the impact and significance of Black and other non-white individuals or deliver an authentic narrative of racialized injustices. Indeed, the entire infrastructure for installing HMTs is an unethical minefield that ought to concern TPC scholars. For example, in Loewen's (1999) extensive examination of public memory sites in the U.S., he lists countless HMTs, memorials, and markers that memorialize white supremacists and many HMTs that are simply inaccurate or an exaggeration of historical data (p. 253). Most egregiously, historical markers elide references to slavery, the struggle(s) for emancipation, and the brutal response to the people agitating for this very American ideal of freedom and liberty (Bright et al., 2020; O'Brien, 2021).

To redress this imbalance, EJI has embarked on a series of tactics to counter the dominant narrative advanced and perpetuated by these markers by joining

with communities to mark sites of racial terror and lynchings. EJI executive director Stevenson in the EJI Catalog (2021) explains that ". . . historical markers change our national landscape; they publicly claim the truth in necessary ways" (p. 93). Since monuments and historical markers are perceived as established institutionalized artifacts that embody settled values, we demonstrate in this article how reified institutional structures strategically operate to maintain the status quo. We contrast that strategy by examining how the work of the EJI counters that narrative, disrupts the legitimacy of those markers, and recovers the erased stories of those whose violent deaths were not memorialized.

To do this work, we (1) establish HMTs as TPC public-facing informational reports that communicate historical knowledge (Haas, 2012; Markel & Selber, 2018, p. 449; O'Brien, 2021); (2) examine how county and state historical commissions actively impede attempts to erect HMTs that communicate the impact and significance of Black individuals or provide an accurate account of racialized injustices; (3) adopt the 4Rs heuristic (Walton, Moore, & Jones; 2019) as a coalitional, truth-telling tactic to redress inequalities in public memory; and (4) bring together EJI's uses of the 4Rs and tactical technical communication to memorialize the lives of the victims of terror lynching. This work uses as its data, the EJI's *Community Remembrance Project* and its work of memorializing, which is itself broken down into Soil Collection, Racial Justice Essay, and the Historical Marker Placement. As Mckoy et al. (2022) argue, "the need to trouble notions of objectivity and neutrality in technical communication is urgent," and we contend that by examining EJI's coalitional tactics, we trouble those notions of objectivity and amplify the work of anti-racist technical communication (p. 2).

## HMTS AS INFORMATIONAL REPORTS

As one of the most basic yet foundational genres of TPC, informational reports present knowledge in an organized manner. Such texts gather and present "clear, accurate, specific information to an audience," and in many cases, they synthesize large quantities of data or findings (Markel & Selber, 2018, p. 449). While conventional informational reports are print documents characterized by a specific format and distinct conventions, O'Brien (2021) establishes HMTs as fitting the definition of informational reports that are increasingly ubiquitous, multimodal and/or multimedia in genre. These newer iterations of informational reports are published online, and as a result, appear different from their traditional print-based counterparts. They often include a greater number of images, as well as videos, infographics, and other interactive components (Phillips, 2018).

As informational reports are published online, practitioners have moved to shorten and or abbreviate the more lengthy ones using a variety of media, including slide decks, short videos, or a single 8" x 11" document. Other types of informational reports, for example, include the *Negro Motorist Greenbook*, which exemplifies the ingenuity of Black technical communicators during times of injustice. While appearing in different platforms, the similarity between these examples demonstrates how technology (both digital and print-based) affords technical communicators the ability to distill information into more concise and readable forms (O'Brien, 2021, p. 3). Taking into consideration a more expansive definition of informational reports, we echo O'Brien's definition of HMTs as "informational reports that describe historical events, individuals, or sites to an audience—those individuals who encounter a roadside marker" (p. 3). In a society dominated by institutional power, HMTs are authoritative texts that operate strategically to disseminate a dominant narrative about racialized violence and terror lynching in the respective societies they appear.

In addition, HMTs are characterized as a technology that has enhanced the genre of the informational report (Haas, 2012). HMTs, as "constructed and useful thing[s] [with] practical application[s]" (Slack and Wise, 2005, p. 95), and as informational reports fit within Haas's (2012) argument that we do not "conflate new media with definitions of technology" (p. 288). For while it is unlikely that the public would study a 20-page informational report about, say, the 1916 lynching of Jesse Washington[1] in Waco, Texas, it is probable that a greater number of people would view and read an HMT in front of city

1 Jesse Washington, a 17-year-old Black teenager, was brutally lynched in Waco, Texas for a crime that he did not commit. He was convicted after four minutes of deliberation.

hall. Thus, HMTs represent a technology that increases visibility, readability, and accessibility to a widely conceived, though unspecifiable, and varied public that may not necessarily be seeking out this content.

## (IN)JUSTICE RELATED TO HMTS AND HISTORICAL COMMISSIONS

In the U.S., each state (and in some cases, each county) has established historical commissions whose role is to educate the public about historical events, places, or individuals. In Texas, for example, the Texas Historical Commission (THC)—with commissioners appointed by the governor—sets state-wide standards for the HMT application process and which HMT applications are approved. Likewise, county-level historical commissions often make the same decisions at the micro-level (J. Littlejohn, personal communication, January 19, 2021). While the THC makes the final decisions about HMTs, it is often county-level commissioners who leverage power to reject HMT ideas even before they are officially submitted to the commission. Take, for example, J. Littlejohn, who recently formed the Montgomery County Remembrance Project (MCRP) with the support of EJI. J. Littlejohn formed the MCRP because the Montgomery County Historical Commission (MCHC) refused to consider erecting an HMT that would memorialize Joe Winters, a Black man who was lynched in 1922. According to J. Littlejohn, the commissioner explained that neither he, nor the MCHC or THC, would be interested in pursuing HMTs that would deal with topics like lynching. This example is not aberrant, though. Across the U.S., historical commissions actively thwart an honest and accurate public memory of the violence perpetrated toward Black Americans (Alderman, 2012; Bright et al., 2020; Loewen, 1999). Loewen (1999) explains that HMTs are composed by historical agencies who wield epideictic rhetoric—in short, they want to "inspire rather than inform" (p. 29). Whether due to bias, fear of consequences, or the desire to maintain white supremacy, these commissions "inspire" through light-hearted or meaningless HMTs and avoid erecting HMTs that confront negative aspects of U.S. history.

O'Brien's (2021) study of Texas's historical agencies demonstrated that in spite of a prolific public memory system, the overwhelming majority of HMTs did not acknowledge racialized injustices, violence, and disenfranchisement of Black, Indigenous, Latinx, and Chinese American individuals. For example, the THC's seemingly progressive decision to introduce the Undertold Marker Program (UMP) in 2006 outwardly appears to broaden the scope of public memory in Texas to address "historical gaps, [to] promote diversity of topics, and [to] proactively document significant underrepresented subjects or untold stories" (THC, 2022). While the newer HMTs depict the challenges that many people encountered because of their race, ethnicity, and country of origin, while highlighting their accomplishments, upon further inspection, the markers fail to provide an accurate account of slavery, Reconstruction violence, and other racialized injustices in Texas history.

We would be remiss not to recognize that newer HMTs demonstrate a movement towards "just representation" (Bright et al., 2020), which means that the UMP has begun the work to communicate the impact and significance of individuals previously not memorialized. However, many of the UMP markers hint at racialized violence and injustice, but they do little to apologize or offer to redress these injustices. Contrast this with, as Loewen (1999) points out, Germany's efforts to memorialize the Holocaust. He lists several sites in the Schöneberg quarter of Berlin: signs that list regulations that limited the movement and rights of Jews, benches with text that say, "No Jews," areas of parks where signs communicate that Jews were forbidden, and other more sweeping monuments and markers throughout the country (p. 417). Loewen writes, "The United States needs similar reminders to show how African Americans . . . Native, Mexican, and Asian Americans were restricted under segregation" (p. 417). We concur. We add that the U.S. needs reminders and apologies of racialized violence enacted via HMTs, including listing the names of individuals who were lynched. To truly rectify past sins, public memory must transparently confront what specific actions were wrong, why they were harmful, and whom they impacted. This is in keeping with the 4Rs heuristic of which we say more below.

In light of institutional intransigence in confronting this history, EJI has resorted to tactics as a means to both confront this history and redress these injustices. For example, EJI argues daily in their social media posts like Instagram: "to overcome racial inequality, we must confront our history." These posts are intended to, and, indeed, reach multiple audiences in different

contexts—audiences with various experiences and forms of expertise. This is a tactical form of outreach in itself as it keeps the issue of past injustices current and present. Below, we conceptualize tactics and then show EJI's tactical approach to redress injustice.

## WHAT IS TACTICAL TECHNICAL COMMUNICATION?

Technical communication has historically been associated with work and the workplace where it is considered a technology, a tool, or a product that enables the workplace (government, organizational, or other institutional entities) to meet its goals (Dobrin, 1983; Kimball, 2006). Certainly, studying codified workplaces and the documentation emerging from them is easier than assorted, often extra-institutional sites. And yet, alongside ensconced institutional practices of TPC are a proliferation of "users as producers" of technical communication as first noted by Johnson (1998). Building on Johnson's work, Kimball (2006) took a compelling angle on tactical and extra-institutional technical communication to demonstrate "the growing importance of technical communication in everyday life as a matter of production as well as consumption" (p. 84). Kimball's work has led to a surge of scholarship amplifying the visibility of tactics and theorizing their forms in everyday life culminating in a Special Issue of *Technical and Communication Quarterly* and an array of articles (see Colton, Holmes, & Walwema, 2017; Sarat-St. Peter, 2017; Kimball, 2017; Edenfield, Holmes & Colton, 2019).

Drawing on the work of de Certeau (1984) to study technical communication in everyday life, the field conceived of tactics as a set of practices of resistance that go up against institutional power and that take place in extra-institutional spaces. To explicate tactics, de Certeau differentiated them from strategies, which he broadly construed as rules, systems, and even structures established to regulate work and life, are hegemonic and propagate power (1984, p. 17). He classified strategies as regulatory and inflexible disciplinary mechanisms, "the calculus of force-relationships" (p. 17) and place-based in locales that are seats of power. From this position, strategies uphold the interests of one group (the institution) while imposing on the other. To counter this power imbalance, tactics emerge, often from within these very institutional structures, by appropriating the levers that legitimize institutional power and by sometimes eroding those power mechanisms. Tactics stand in contrast to strategies as individualized appropriations of strategies and implicit forms of resistance. To be clear, tactics do not exist to topple strategies; rather, they emerge in response *to* and as a foil *against* entrenched often oppressive practices. In the rawest of forms, tactics are a means to contest the social order stratified by strategies, to create agency for those without the strategic power.

Still, an examination of tactical technical communication has unearthed its discursive elements (Knievel, 2019) and the very authentic technical communication that takes place in extra-institutional sites as practical technological know-how (Cockburn, 1988, p 18). Seeing tactics as vehicles for seeking redress, given its targeted actions to create resistance, attract and sustain action to a cause, and demand redress is now common. That work has led to the possibility of appropriating tactical technical communication to "further the field's interest in social justice (Edenfield, Holmes & Colton, 2019, p. 177), and for purposes of this study, perhaps attain a sense of restorative justice. For, as a surge of recent scholarship has shown, TPC should go beyond naming injustices (Jones, 2016).

This article builds on a totality of this scholarship to contend with the role, perhaps inadvertently, of tactical technical communication, in restorative justice. Specifically, it examines the agency of Black Americans in reclaiming their own history through the tactical nature of the Equal Justice Initiative's (EJI) approach to memorializing victims of racial terror lynching. To understand these tactics, we sought to answer this question: What textual, visual, and design tactics does the EJI deploy/employ to counter the dominant approach to installing historical marker texts? How does this work memorialize the lives of the victims of racial terror lynching and thereby restore the humanity that was denied them in death?

To answer these guiding questions, we looked at a number of resources from the Equal Justice Initiative and settled on analyzing its catalog titled, *Community Remembrance Project*. While the EJI has several resources in the form of videos, reports, teachers' guides, lesson plans, memorial, and museum, we found that the *Community Remembrance Project* catalog laid bare the tactics of EJI. The catalog describes EJI's various methods and methodologies, but it ultimately

focuses on the Community Remembrance Project (CRP), which consists of Soil Collection, Racial Justice Essay Contest, and Historical Marker Program. For this study, we used Walton et al.'s (2019) 4Rs heuristic to perform a rhetorical analysis of the catalog for the purpose of illustrating how EJI is enacting this theory in tangible ways. Based on our establishment that HMTs are information technical documents, we extend that definition to the EJI's Community Remembrance Project Catalog for creating HMTs memorializing the lives of the victims of terror lynching to counter the dominant narrative advanced by state, county, and local commissions.

## THE EJI COMMUNITY REMEMBRANCE PROJECT CATALOG

The EJI Catalog, *Community Remembrance Project: A New Commitment to Truth and Justice,* is a 164-page booklet designed for visual appeal. The cover portrays a family of three, two adults and one child, who are partially submerged in water alongside the hull of a ship. Inscribed within this image are the words, "May we never forget all those who suffered and died because they asserted their basic human right to be free." That cover in Figure 2 frames the contents of the Community Remembrance Project.

Inside, the catalog opens to introductory pages, one of which repeats the information on the cover page and the other a table of contents. The subsequent pages then unfold in descriptive text, images of historical markers, photographs of people engaging in various community actions, and pictures of the Legacy Museum and the National Memorial for Peace and Justice.

EJI communicates the mission of CRPs towards the beginning of the catalog through a repetition of the following clause: "EJI invites communities to engage . . ." (p. 6). This clause introduces the CRP as a coalition of community members who partner with EJI to accomplish a set of goals. A coalition, as defined by Walton et al. (2019), is firstly an intersectional endeavor that centers the lived experiences and perspectives of multiply marginalized individuals (p. 134). As an intersectional group of people, coalitions do not use a single lens to interpret inequity (e.g., sexism, racism, etc.); rather, coalitions handle oppression through a variety of perspectives. Walton et al. also define coalitions as groups who work collectively "to understand oppression and spur change" (p. 134). As a result of working collectively, members do not always get to define for themselves the direction of the group but instead attend to coalitions that are already in place. These are the characteristics of a coalition: intersectionality and collectivity. In examining the catalog, we contend that EJI's community work is indeed a coalition that promotes intersectionality and collectivity in several ways.

A CRP begins by considering what conversations have been ongoing in the community and/or which groups are already working to advance truth-telling efforts (EJI, 2021, p. 31). EJI refers to these actions as "intentional community assessment," and that they serve to evaluate the dynamics within a community *before* introducing a CRP. This perspective is in contrast to one that would seek to colonize community work that is already in place. Likewise, EJI highlights the impacts of a CRP on local communities, which includes African Americans who are relatives or descendants of individuals who were lynched. Thus, if possible, a

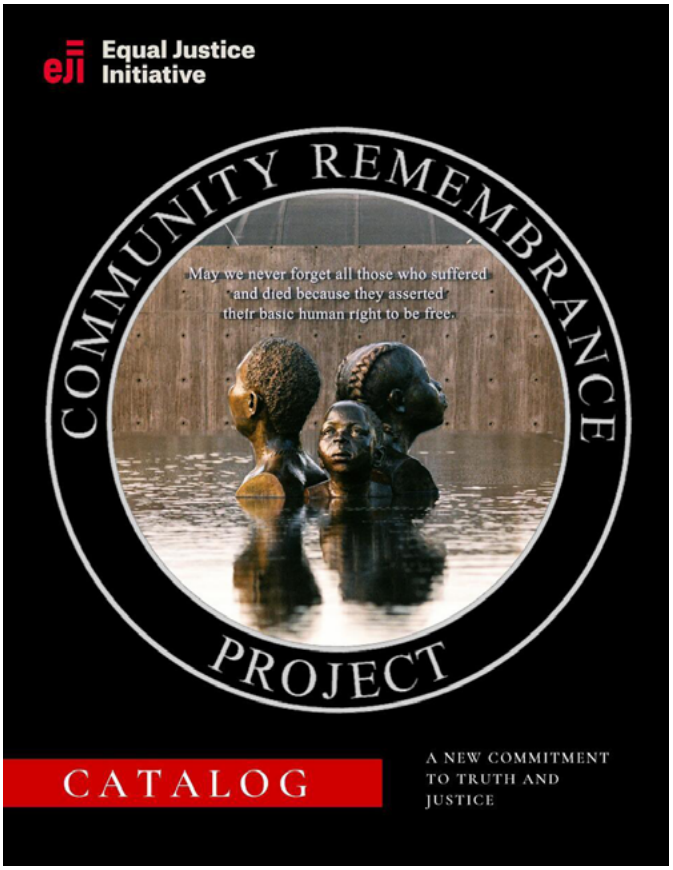


**Figure 2. Community Remembrance Project Catalog cover**

CRP must incorporate their stories into the research process. Often, these relatives serve on the CRP and are key figures in community events, such as the unveiling of a historical marker that memorializes a lynching or a commemorative march (p. 92). In addition, the members of a CRP should represent a wide range of people, including school board members, students, town board members, university faculty, church members, and many others. With such a diverse group of people, a CRP is well-positioned to address local concerns, like criminal justice and policing, education, housing, and other social justice-related issues (p. 35). In most cases, also, CRPs are chaired or co-chaired by Black community members to center the viewpoints and experiences of people who have directly borne the trauma that resulted from racial terror (pp. 12, 32).

In addition to describing the characteristics of a CRP, EJI also clarifies the purpose of the catalog early in the document: "EJI invites communities to engage in restorative truth-telling efforts to work towards repairing the harms caused as a result of an era of enslavement, an era of racial terror lynching and violence, an era of Jim Crow segregation, and an ongoing era of mass incarceration in our nation. EJI believes that these efforts are critical to advance a new era of truth and justice" (p. 6). EJI positions anti-Black bias and discrimination as one continuous ideology that began with enslavement, continued through Reconstruction with racial terror lynching and violence, through Jim Crow segregation, and carries on to the present day with the ongoing reality of police brutality and mass incarceration. Thus, the purpose of the catalog is to educate communities about how they can be a part of restorative truth-telling efforts that directly respond to these events, as well as how in most communities, these events have been intentionally erased or disregarded to maintain white supremacy. Truth-telling efforts, which demonstrate a culture's commitment to diversity and social justice are also issues that impact technical communicators. As Jones (2016) argues, "A critical approach to diversity and social justice helps to legitimize TPC by providing scholars a way to acknowledge the impact of communication as a way of mediating the human experience" (p. 343).

While we focus specifically on the CRP's three-pronged campaign, in addition to these three efforts, the catalog depicts other ways that communities can "engage in restorative truth-telling efforts" via book panels and discussions (pp. 36–37), film and documentary screenings (pp. 40–43), social media awareness campaigns (pp. 44–45), art exhibits that illustrate past and present injustices (pp. 48–51), historical showcases (pp. 52–55), and many other alternatives. Essentially, the catalog aims to answer the question: How can a community advance truth-telling efforts and work towards repairing the harm against Black Americans? The answer addresses our research question with respect to the tactics EJI deploys/employs and exemplifies how this work memorializes the lives of the victims of racial terror lynching.

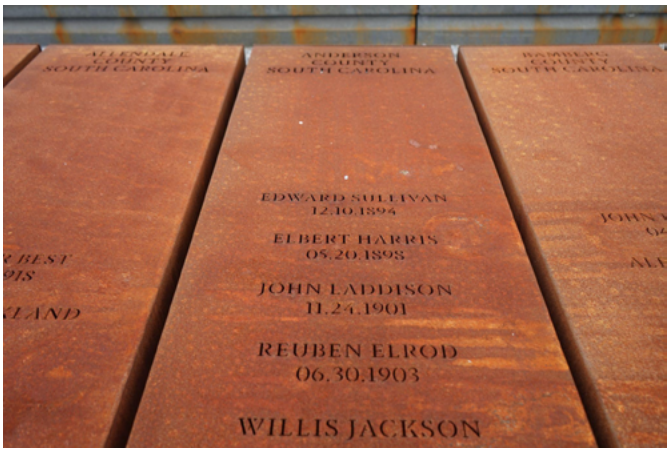


**Figure 3. Duplicate monument**

Because we are interested in understanding the operations of the EJI, we closely examined the Community Remembrance Project (CRP) (2021) as documented by the catalog. The CRP includes a three-pronged campaign:

1. Soil Collection Community Project (p. 78)
2. Historical Marker Projects (p. 92)
3. Racial Justice Essay Contest (p. 106).

This trio represents incremental steps in the service of a larger goal, which, ultimately is to create a national memorial that acknowledges the horrors of racial injustice.

To that end, EJI (2021) seeks to place a monument (like those represented in the NMPJ) in local communities around the country as "part of a larger movement to create an era of restorative truth-telling and justice that changes the social consciousness of our nation" (p. 119). However, the catalog clearly explains that monument placement is to be considered the last step in an extensive community-engaged project (see duplicate monuments in Figure 3). As Stevenson writes,

"The monument placement isn't meaningful unless it's surrounded by increased consciousness" (p. 121). Truth-telling efforts in communities are intended to be genuine and sustained—thus, EJI focuses on the importance of the CRP as "the most substantive and impactful features of a larger racial justice movement" (p. 123). We see in each of these campaigns the tactics deployed by EJI towards achieving its ultimate goal.

## METHOD

We employed several levels of analysis in this study. As earlier indicated, our data was derived from the EJI Catalog which includes Soil Collection, Racial Justice Essay Contest, and Historical Marker Program. We employed a rhetorical critical analysis based on Campbell & Burkholder (1996) to systematically illuminate and evaluate the selected artifacts. That allowed us to assess the overall communicative purpose of the artifacts and how they function to realize that purpose. We performed a detailed description of the artifacts, situated them in their relevant historical context, and critically evaluated their effects, values, and artistic traits. This level of rhetorical critical analysis helped us elaborate on the EJI's tactical approach to HMTs that we observed. Through this approach, we were able to critically consider the meanings of tactics in addressing questions of community and memorializing the lives of the victims of terror lynching.

For the next level of analysis, we took up the 4Rs heuristic articulated by Walton et al. (2019) to study EJI's approach to redressing inequalities, namely—Recognize, Reveal, Reject, and Replace. We contend that through tactics and 4Rs, the work of the EJI truth-telling efforts intervene in the country's racist public memory system. For our analysis, we considered Walton et al.'s description of each of the 4Rs and considered how EJI was recognizing, revealing, rejecting, or replacing via the actions of a CRP. The 4Rs can be applied to various scenarios, groups, or applications, but we focus here on how EJI enacts these four principles and in conjunction with community partners that we find EJI's Historical Markers, Soil Collection, and Racial Justice Essay Contest as key to their tactical interventions.

The first R, *Recognize,* begins at the thinking level to "recogniz[e] injustices, systems of oppression, and our own compliance in them" (Walton et al., 2019 p. 133). We coded a tactic as "recognize" in the EJI Catalog if it described injustice in a community. Since a CRP focuses on the erasure of Black history in many communities, the "recognize" step is depicted in the catalog by a community realizing that a public memory injustice has occurred and considering the role that members in a community have played in the oppression. The second R, *Reveal*, extends thinking into action as it is characterized by educating and "revealing these injustices, systemic oppressions, and complicities to others as a call-to-action and organization/social/political change" (Walton et al., 2019 p. 133). We coded a tactic as "reveal" in the catalog if it highlighted how community members could work collaboratively to address the injustice. The third R, *Reject*, continues the action-oriented framework established and seeks to reject "injustices, systemic oppressions, and opportunities to perpetuate them" (p. 133). We coded a tactic as "reject" in the catalog if it described specific ways that a community could resist racist white-centric public memory. And the final R, *Replace*, lays out ways for "replacing unjust and oppressive practices with intersectional, coalition-led practices" (p. 133). We coded a tactic as "replace" if it constituted a change or material action, like placing a new HMT in a community or hosting a march to remember Black community members who were lynched. Since Walton et al. argue that the 4Rs as intersectional and coalitional, we note the ways that CRPs are coalition-led groups that seek to replace oppressive behaviors, structures, or decisions. These Rs help us to emphasize how EJI works alongside community organizations to research lynchings, write the text of a historical marker, fund the creation of that marker, and help community members connect with others in the area for the marker's placement.

## ANALYSIS

### Soil Collection

The first tactic, soil collection, represents one of the ways that EJI partners with communities by "commemorat[ing] and recogniz[ing] the traumatic era of racial terror by collecting soil from lynching sites" (EJI, 2021, p. 78). This research stage of soil collection demonstrates how the EJI encourages a CRP to first recognize the injustices and violence, which is the first R (Walton et al., 2019, p. 133). The

process of soil collection begins with a CRP's research of local lynchings, given that these lynchings were a communal rural phenomenon. EJI (2021) provides a number of resources, including several reports that document various eras of racial injustice, including *Slavery in America, Reconstruction in America, Lynching in America, Targeting Black Veterans, Segregation in America,* and *Racial Discrimination in Jury Selection* (p. 128). These reports, along with other educational resources, provide a foundation for CRPs to research local lynchings in their communities. Researching the details of specific lynchings serves two purposes. First, the data directly informs the writing of the historical marker, and second, the information helps a CRP pinpoint where the lynching took place. Once a CRP has accumulated enough data, they can plan a range of events to memorialize the person (or persons) who were lynched (p. 78).

Stevenson explains the significance of soil collection: "In the soil, there is the sweat of the enslaved. In the soil there is the blood of the victims of racial violence and lynching. There are tears in the soil from all those who labored under the indignation and humiliation of segregation. But in the soil, there is also the opportunity for new life, a chance to grow something hopeful and healing for the future" (EJI, 2021, p. 81). The expression "if these walls could talk" is perhaps best suited to understanding the significance of the soil as a witness to the lynchings, a recognition of the symbolic meaning encased in this place. And as this soil is collected from sites that are known to be locations of the brutal lynchings, we consider this a revealing act. Moreover, the soil collection often includes a ceremony honoring the life of the deceased. That soil is placed in a jar engraved with the name of the victim or marked "unknown" (if the victim's name is not known) along with the date and location of their killing. The jar is then sent to the Legacy Museum where it is displayed alongside others. Other times, a CRP may choose to place jars in local communities' spaces with a lot of public interaction, like libraries, community centers, and history museums (p. 79). The various local and national ceremonies and jar placement operations showcase how the EJI works with a CRP to reveal and reject injustices and violent oppressions, which are the second and third Rs (Walton et al., p. 133). And they are a recognition of the deceased's humanity who, in this moment, is given a sendoff with rites associated with and befitting death. The action satisfies people's desire for their bodies to be properly interred, which is a crucial social dynamic that returns the dead to their place of origin. These bodies were denied this sacred act when victims were lynched, their bodies publicly displayed, often for several days, and parts of their bodies sold and distributed.

The soil collection is a somber ceremony that is replete with the ritual functions of death, mourning, and funeral oration. But it is not simply ritual for its own sake, for it achieves meaning and function beyond the moment. Soil collections generate a kind of knowledge that resurrects the memory of the lynched victim akin to an "urn of ashes" from a cremation. Those who are present are constituted as witnesses to this act by recreating the act of a funeral. The energy associated with such a ritual might prompt them to consider their place in restoring a sense of harmony even in the face of brutal injustice of a life mourned. Such discourse induces the kind of narrative that is not limited to that space and time. Moreover, during the ceremony which is attended by family members, volunteers and interfaith clergy, the name leads to "hosting community conversations" (pg. 39) and "reflective gatherings" (p. 65) as acts constitutive of community. The end result of these acts is preserving the memory of the deceased, whose life was literally snuffed without dignity. As Allison Bantimba, coalition liaison for the Fulton County Remembrance Coalition explains, "We want to change the narrative around how we talk about our history . . . Most of this happened in public spaces. People kept souvenirs. There were postcards. It really was terrorism, and we've never acknowledged the severity of it and that it continues in various forms" (EJI, 2021, pp. 90–91). Coalitions, like the ones described in the catalog, verify how CRPs not only recognize, reveal, and reject racial oppression, but they also replace these injustices through these coalition-led efforts (Walton et al., 2019, p. 133). Moreover, this somber ceremony stands in contrast to the celebratory gatherings and public display of white power that accompanied terror lynching that left a chilling effect on Black communities.

And these tactics have led to broader policy initiatives such that at state levels like Maryland, the cause of reconciliation has been taken up through House Bill 307, which establishes a Maryland Lynching Truth and Reconciliation Commission (2019). This

commission is authorized to do the work that EJI does including researching (to reveal sites of lynching) and holding public gatherings that memorialize the deceased. Thus, what began as a simple act of collecting soil has paid off monumentally at state level which would otherwise never have been the case. While much of the United States has averted its gaze from atrocities committed against Black Americans whose family members were lynched, the EJI, through its tactics, has not created divisions as was feared. Instead, it has created a human bond and ushered in a new paradigm of social interaction.

Soil collection in the EJI's tactical arsenal appears at once mundane and imaginative. In any case, it satisfies de Certeau's (1984) exemplar of tactics as acts that emerge from quotidian practices of "the weak" appropriated towards their own ends. While he never imagined soil collection as an act of the weak, de Certeau would nevertheless consider this an ordinary and activist act that inverts the "strategies of public space and silently organiz[ing] the language" (De Certeau, 1984, p. 66). And it is consistent with EJI's work of revealing and exposing the injustices of old. Not only that, but it is also a call to community partners to redress the present. Cook, Logan, and Parman (2018), who examined the relationship between segregation and lynching in the South, where interracial violence was at its most extreme, found that interracial violence and Black lynching was highly correlated with segregation. Moreover, those patterns of violence persist today. They are, however, manifested differently, mostly through the disinvestment in public goods (Cook, et al, 2018).

Unearthing the terror through the tactics of soil collection draw a through line from slavery to segregation and the violence associated with it and modern-day injustices. They are also consistent with Kimball's (2017) articulation of a kind of "tactical technical communication," that characterized the work that ordinary people do to reframe official forms of technical communication "on their own, working outside of, between, and even counter to organizations" (p. 1). He demonstrated that technical communication becomes tactical when everyday users appropriate "technology to increase their freedom of agency and their involvement in shared cultural narratives" (Kimball, 2006, p. 68). The institutional failure of state and local government opened up the space into which EJI has stepped to recognize and acknowledge an injustice, which is an active form in(re)producing new schemas of relations that go against hegemonic structures.

## Racial Justice Essay Contest

The second tactic, the racial justice essay contest, illustrates EJI's commitment to "uplift students' voices in conversations of racial justice and equity" (EJI, 2021, p. 107) through the Racial Justice Essay Contest. Since most CRPs are intentionally diverse and community-led, members often have ties to local school boards, or are educators or students. As a result, a CRP will leverage these organic community relationships to educate, advertise, and involve local high school students. As the essay contest is generally open to 9th–12th grade students who attend public high schools within the county of the CRP, it provides an opportunity for teachers to incorporate EJI's lesson plans or archival research in the school curriculum priming it ready for students to examine the history of racial injustice in their local community. Considering that EJI funds the essay contest, students can expect awards of at least $5,000 distributed among the winners—although all students who participate receive a gift (p. 107). The logistics of the essay contest are determined by both EJI and a CRP who work collaboratively to build a customized website and to educate the local community about the contest.

The essay contest is a carefully orchestrated iterative set of actions that involve choosing an essay topic based on a historical event documented by the EJI and local to the community from which the student hails; creating a theme and topic capturing that history; (the student) carrying out research on the selected theme and topic; and finally, writing an essay responding to this prompt. Where Soil Collection addresses the materiality of memory by both recognizing and revealing specific acts of racial terror, the Racial Justice Essay Contest invites high school students to investigate racial injustice in their hometown, which encourages community members to recognize, reveal, and reject injustice and racism. The Lee County Remembrance Project (a CRP) in Lee County, Alabama, for example, provided a prompt for students participating in the essay:

> A myth of Black inferiority and white supremacy was developed to justify slavery in the United States. Even though we ended chattel slavery, we did not end the myth of racial difference. EJI believes we need a new era of truth and justice

> that starts with confronting our history of racial injustice. Based on the theme or topic and historical event you selected, how does the history of racial injustice help to explain present-day injustice in our society? How can this history be overcome in order to change the challenges our nation is facing today? (EJI Lee County)

While just one example of an essay prompt, this instance challenges students to recognize (the first R) the injustices that led to terror lynching. Because the essay prompt invites writers to connect the past to the present, it enables writers to reject racial hierarchy and to instead reveal equal justice (the third and fourth Rs).

The essay contest is a good example of tactical engagement by students in the lives of their fellow citizens whose demise has otherwise not been acknowledged. As a tactic, the essay contest provides an opportunity for students in school related activities to encounter subject matter that is different from the mandated high school curriculum. That curriculum, which is part of States' strategy, sidesteps the legacy of slavery and lynching as Harriot (2020) finds from his analysis of school textbooks sanctioned in most Southern states. Harriot singles out the United Daughters of the Confederacy's "outsized role" in downplaying the role slavery plays in the early history of the country (para 10). Through a revisionist history that includes "happy slaves and brave, honorable white men" who championed states' rights, those textbooks dominated the way history was taught in large swathes of the south. The essay contest directly challenges that history by working with primary and community tools of research to uncover the real history surrounding the lives and deaths of these human beings. Search research is an invaluable tactic for user-producers in empowering other communities. Moreover, given that events surrounding the essay contest are tightly interwoven in the CRP with contest winners awarded scholarships and given room to read their essays at the installation of the HMT memorializing an individual in the respective community, the celebratory nature of the essay contest allows for wider circulation and participation in racial justice and equity (p. 107). The essay contest recognizes the injustice of racial lynching even as the process of research reveals the details associated with those deaths. And the prompt gets students to reject the systems that made possible the heinous crime of terror lynching and to suggest just systems in their place.

## Historical Marker Project

The Historical Marker Project is motivated by Stevenson's view that "the public narrative a nation created about what is important is reflected in memorials and monuments . . . in who is honored, what is remembered" (EJI, 2021). To confront the historical legacy of terror lynching and create a counternarrative of who is memorialized, the Historical Marker Project (HMP), enacts all 4Rs—Recognize, Reveal, Reject, and Replace. As a collaborative, community-engaged project, the HMP compels people to form coalitions that educate others about racial injustice, combat narratives of white supremacy, and speak truth into the spaces and places that have been whitewashed by historical commissions. EJI (2021) positions a historical marker as "a compelling tool [that creates] a permanent record of racial terror violence" so that the entire community can be "expos[ed] to our shared history of racial injustice" (p. 93). This exposure is not intended to create guilt for white community members; rather, it is created as a tool for healing. Truth-telling promotes healing when it is crafted with humility and grace (see Walton et al., 2019 on "change-making with humility" p. 134). The ceremony itself serves as a collective of grief and mourning associated with interment. It echoes, in the words of Frederick Douglass (1854), "the prayer and complaint of souls boiling over with the bitterest anguish" (p. 245).

The HMP functions as a coalition in that community members work together to build connections with surviving family members of individuals who were lynched, research the events surrounding the lynching, define a geographical region where the lynching took place, write the text, and work with EJI to revise the text, receive the physical marker, and establish a ceremony for its unveiling (EJI 2021, pp. 94–95). The HMP illustrates one of EJI's most overt tactics. Since historical commissions are generally opposed to placing markers that discuss lynching and other racialized oppressions, the HMP provides a different path for community members. First, instead of needing approval from county and state commissions, community members can form a coalition and work with EJI to place an HMT in their town/city. This tactic alone is transformative, especially because many historical commissions purposely exclude multiply marginalized people from the HM process through

overly complex applications, financial obligations, and literacy tests (O'Brien, 2021).

Applying for HMT using the state apparatus is an isolating, confusing, and exclusionary process, but as a result of the EJI's tactics, placing an HMT in local communities becomes a collaborative, inclusive process. This work is done with the CRPs, who research the lynching without constraints from literacy "hoops" that exclude people from participating in the memorialization process. Likewise, because a CRP is an intersectional coalition composed of community activists, academics, students, local church members, government officers, and laypeople, CRP members who take part in the HMP can work together to perform the research and writing of the HMTs (EJI, 2021, p. 93). Likewise, the CRP members who research and write the HMT work alongside the EJI through the research and revision process and have the benefit of EJI's vast databases for information (p. 14). Secondly, EJI supervises the logistics of and pays for the HM placement, which includes the fabrication of the actual marker and the revision of the text. The text is placed on both sides of the marker with one side narrating the life of the victim being memorialized and the other contextualizing the trauma and legacy of terror in which the victim was lynched. Such a tactic reveals or brings forth what has been excluded in the accounts of the U.S. South.

## IMPLICATIONS

The work of the EJI as we discuss it here shows a marked difference from the outlook of state and local government in which those institution's operational frameworks suppress information on terror lynching. Our study demonstrates that out of state and local government's fixed locales of power, the inevitable tactics of the powerless situated in the EJI began to emerge (de Certeau, 1988, p. xii). As Stevenson has long argued, these injustices are "wrapped in America's unexamined history" of slavery (Schneider, 2019) in which a through line "from slavery to lynching to mass incarceration" not to mention the excessive punishment disproportionately meted out to the descendants of enslaved people explains the present (Stevenson, 2019). Indeed, Stevenson's linking of past injustices to present outcomes has been borne out in the literature. Economists Logan and Parman (2017) have established links between past violence in the South and modern outcomes such as "homicide rates, lack of compliance with hate laws, and urban segregation patterns" (Logan and Parman, 2017, p. 165). EJI's work counters state and local governments' downplaying of racism and slavery's centrality to U.S. history thereby perpetuating the narrative that not only was slavery itself not contentious, but also a positive good.

EJI's CRP efforts with the Historical Marker Project (HMP) clearly demonstrate how coalitions can tactically intervene in racist systems—like historical commissions that reject truth-telling efforts—by creating a different path for historical markers to be erected in communities. Even the location of the EJI is tactical. The EJI is based in Alabama, a state known simultaneously as the cradle of the confederacy and the birthplace of the Civil Rights movement. Thus, the location of the EJI is itself a tactical stance against state subjugation and perhaps a continuation of the battle of civil rights post confederacy. If the work of the EJI in defending the rights of the incarcerated in courts of law might have been considered invisible and abstract, its launch of the Legacy Museum (LM) and the National Memorial for Peace and Justice (NMPJ) is not.

Since Kimball's (2006) articulation of tactics as extra-institutional forms of technical communication, the aperture of technical communication has expanded, giving the discipline the vocabulary to explain the shift from passive users of technical communication products to active producers. Such active producers readily participate in what Kimball (2017) calls "radical sharing" (p. 4) (see Bellwoar, 2012; van Ittersum 2014; Walwema, Sarat-St. Peter, and Chong, 2019)—a form of tactical technical communication in which the creative use of the practice of everyday life caters to the needs of those left out of the power structures enshrined in their strategic intent. As well, a special issue of *Technical Communication Quarterly* on Black Technical Communication (Mckoy et al., 2022) elucidates the form of technical communication at play in the work of the EJI's efforts to confront, in essence, the Lost Cause narrative that permeates American discourse. Specifically, the U.S. South's failure to acknowledge terror lynching of Black Americans, whose frequency, historians point out, coincided with the erection of monuments (SPLC, 2021). Failure to grapple with this tragic history or worse, the tendency to cover it up, has generated insecurities that birth other forms

of violence like the kind we saw at Charleston's AME Mother Emanuel Church. EJI is attempting to foil this narrative by drawing from, borrowing, adapting, and even institutionalizing the strategies of veneration consistent with Black culture and history for new ends not previously catered to. It is striking that some of the displays of the HMT, for example, are directly juxtaposed with the statues of those the state(s) chose to honor—thus, telling the whole story.

## CONCLUSION

As we have shown, the EJI's founder, Bryan Stevenson, had argued that it was odd for the United States not to memorialize its victims of lynching. He contrasted this stance with that of other nations' comparable memorials to apartheid in South Africa, genocide in Rwanda, and the holocaust in Germany. Concerned that not only were there no memorials to lynching victims in a nation awash in memorials to and preservation of the confederacy, the dominant narrative erased victims' names and the stories surrounding their lynching (see Bunn, 2017). It is within this vision that the NMPJ and LM, both dedicated to victims of white supremacy, were launched in Montgomery, Alabama. Needless to say, the memorial has attracted criticism from the same people who honor the confederacy with accusations of "opening up old wounds" and "let sleeping dogs lie" (Levin, 2018).

We have shown how this work has circumvented state and local government priorities that have long silenced their historical legacies of terror lynching to offer a historical telling of Black history from enslavement to mass incarceration. Ultimately, this work lays bare to TPC the manner in which the EJI centers the historical telling of Black history in the United States as critical in imagining a socially just nation in which restorative justice can be enacted. We agree with the EJI's practical belief that this nation's history of racial injustice has tainted its ability to create an equitable society and that contending with this historical past in all its truths will enable us as a society to root out systemic injustice. Moreover, to center Black people as the subject of the Civil War renders them agents of their story, places them in the history that made HMTs necessary in the first place and tells a complete rather than competing story.

## REFERENCES

Alderman, D. H. (2012). "History by the spoonful" in North Carolina: The textual politics of state highway historical markers. *Southeastern Geographer*, *52*(4), 355–373.

Bellwoar, H. (2012). Everyday matters: Reception and use as productive design of health-related texts. *Technical Communication Quarterly*, *21*(4), 325–345.

Bright, C. F., Foster, K. N., Joyner, A., & Tanny, O. (2020). Heritage tourism, historic roadside markers and "just representation" in Tennessee, USA. *Journal of Sustainable Tourism*. Retrieved from https://doi.org/10.1080/09669582.2020.1768264.

Brounéus, K. (2010). The trauma of truth telling: Effects of witnessing in the Rwandan Gacaca courts on psychological health. *Journal of Conflict Resolution, 54*(3), 408–437.

Bunn, C. (2017, April 11). Death row lawyer Bryan Stevenson plans a lynching memorial in Alabama. Project will honor the victims of 'racial terrorism.' *The Undefeated.* https://theundefeated.com/

Campbell, K. K., and Burkholder, T. A. (1996). *Critiques of contemporary rhetoric*. Belmont,

California: Wadsworth Publishing Company.

Cockburn, C. (1988). *Machinery of dominance: Women, men, and technical know-how*. Boston, MA: Northeastern UP.

Colton, J. S., Holmes, S., & Walwema, J. (2017). From noobguides to #OpKKK: Ethics of anonymous' tactical technical communication. *Technical Communication Quarterly*, *26*(1), 59–75.

Cook, L., Logan, T., & Parman, J. (2018). Racial segregation and Southern lynching. *Social Science History*, *42*(4), 635–675.

de Certeau, M. (1984). *The practice of everyday life*. Berkeley, CA: University of California Press

Dickinson, G., Blair, C., & Ott, B. L. (2010). *Places of public memory: The rhetoric of museums and memorials.* University of Alabama Press.

Dobrin, D. (1983). What's technical about technical writing. In P. V. Anderson, R. J. Brockmann, & C. R. Miller (Eds.), *New Essays in Technical and Scientific Communication: Research, Theory, Practice*. Farmingdale, NY: Baywood, 227–250.

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Douglass, F. 1845. *Narrative of Frederick Douglass, an African slave. In the classic slave narratives*, ed. H. L. Gates, Jr. (1987), 243–332. New York: Mentor

EJI. (2021). *Community remembrance project: A new commitment to truth and justice.* EJI.

EJI. (n.d.). Community Historical Marker Project. EJI is joining with communities to install narrative historical markers at the sites of racial terror lynchings. https://eji.org/projects/community-historical-marker-project/

Edenfield, A. C, Holmes, S., & Colton, J. S. (2019) Queering tactical technical communication: DIY HRT," *Technical Communication Quarterly*, *3*(28), p. 177–191

Haas, A. (2012). Race, rhetoric, and technology: A case study of decolonial technical communication theory, methodology, and pedagogy. *Journal of Business and Technical Communication*, *26*(3), 277-310.

Harriot, M. (2020, May 4). We found the textbooks of senators who oppose *The 1619 Project* and suddenly everything makes sense. History. *The Root. https://www.theroot.com/we-found-the-textbooks-of-senators-who-oppose-the-1619-1846832317*

Johnson, R. R. (1998). User-centered technology. Albany, NY: State University of New York Press

Jones, N. N. (2016). The technical communicator as advocate: Integrating a social justice approach in technical communication. *Journal of Technical Writing and Communication*, *46*(3), 342–361.

Kimball, M. A. (2006). Cars, culture, and technical communication. *Technical Communication Quarterly*, 15(1), 67–86.

Kimball, M. A. (2017) Tactical technical communication. *Technical Communication Quarterly*, *26*(1), 1–7.

Knievel, M., 2019. '…Darn thing just kind of fell together by itself after a while': Exploring the role of official and tactical communication in siting a rural wind farm. Open Library of Humanities, *5*(1), p.3. DOI: http://doi.org/10.16995/olh.375

Levin, S. (2018, April 18). Lynching memorial leaves some quietly seething: 'Let sleeping dogs lie' The brutal new memorial to the south's dark side has left some in Alabama frustrated and angry at its insistence on confronting the past. The Guardian. https://www.gooriweb.org/news/2000s/2018/guardian28apr2018.pdf

Loewen, J. W. (1999). *Lies across America: What our historic sites get wrong*. New York: Simon & Schuster.

Logan, T., & Parman, J. (2017). The national rise in residential segregation. *The Journal of Economic History*, *77*(1), 127–170.

Maryland Lynching Truth and Reconciliation Commission. House Bill 307. (2019). https://legiscan.com/MD/bill/HB307/2019#:~:text=Establishing%20a%20Maryland%20Lynching%20Truth,white%20mob%20has%20been%20documented

Mckoy, T., Shelton, C., Davis, C., and Frost, E. (2022). Embodying public feminisms: Collaborative intersectional models for engagement. *IEEE Transactions on Professional Communication, 00*(00), 1–17.

Mckoy, T., Jones, N., Shelton, C., Wourman, J., Haywood, C., Sackey, D., and Harper, K. (2022). Guest Editors: Black Technical and Professional Communication. *Technical Communication Quarterly*

MASS Design Group. (n.d.). *The national memorial for peace and justice.* MASS. https://massdesigngroup.org/work/design/national-memorial-peace-and-justice

Markel M. & S. A. Selber. (2018). *Technical Communication*. (12th ed.). Bedford/St. Martin's.

Morris, A. G. (2011). *Missing & Murdered: A personal adventure in forensic anthropology.* Cape Town: Random House Struik.

O'Brien, A. L. (2021). Exclusionary public memory documents: Orientating historical marker texts within a technical communication framework. *Technical Communication Quarterly, 31*(2), 111–125.

O'Brien, A. L. (2018). Horrorism and ontological dignity: What do/not historical signs tell us? *Present Tense*, 7(1), Retrieved from https://www.presenttensejournal.org/volume-7/horrorism-and-ontological-dignity-what-do-not-historical-signs-tell-us/.

O'Brien, A. L. & J. C. Sanchez. (2021). "Racial countermemory: Tourism, spatial design, and hegemonic remembering." *Journal of Multimodal Rhetoric,* Retrieved from http://journalofmultimodalrhetorics.com/5-2-issue-o-brien-and-sanchez

Ore, E. J. (2019). *Lynching: Violence, Rhetoric, and American Identity.* Jackson: University Press of Mississippi.

Phillips, W. (2018, May 22). The oxygen of amplification: Better practices for reporting on extremists, antagonists, and manipulators. *Data & Society.* Retrieved from https://datasociety.net/library/oxygen-of-amplification/

Poirot, K & Watson, S. (2015). Memories of freedom and white resilience: Place, tourism, and urban slavery. *Rhetoric Society Quarterly*, 45(2), 91–116.

Price, J. 2002. "Diversifying the marks of history." *The News & Observer* (Greensboro, NC), 1 January, p A1.

Robertson, C. (22 Apr. 2018). A lynching memorial is opening. The country has never seen anything like it. *The New York Times*, Retrieved 4 Feb. 2021, from https://www.nytimes.com/2018/04/25/us/lynching-memorial-alabama.html.

Sanchez, J.C. & Moore, K.R. (2015). Reappropriating public memory: Racism, resistance and erasure of the Confederate defenders of Charleston monument. *Present Tense, 5*(2). http://www.presenttensejournal.org/wp-content/uploads/2015/12/SanchezMoore.pdf.

Sarat-St. Peter, H.A. (2017). 'Make a bomb in the kitchen of your mom': Jihadist tactical technical communication and the everyday practice of cooking. *Technical Communication Quarterly*, 26(1), pp. 76–91.

Schneider, K. (2019, May 21). Revitalizing Montgomery as it embraces its past. *The New York Times*.

Slack, J. D., & Wise, J. M. (2005). *Culture + technology: A primer.* New York, NY: Lang.

SPLC (2021, April 27). Whose heritage? Public Symbols of the Confederacy. *Southern Poverty Law Center* https://www.splcenter.org/data-projects/whose-heritage

Stevenson, B. (2019, August 14). Why American prisons owe their cruelty to slavery. The 1619 Project. *The New York Times Magazine*. https://www.nytimes.com/interactive/2019/08/14/magazine/prison-industrial-complex-slavery-racism.html.

Tell, D. (2019). *Remembering Emmett Till.* University of Chicago Press.

Texas Historical Commission (THC). (2022). State Historical Markers. https://www.thc.texas.gov/preserve/projects-and-programs/state-historical-markers.

Van Ittersum, D. (2014). Craft and narrative in DIY instructions. *Technical Communication Quarterly*, *23*(3), 227–246.

Walton, R., Moore, K. M., & Jones, N. N. (2019) *Technical communication after the social justice turn: Building coalitions for action*. Routledge.

Walwema, J; Sarat-St. Peter, H., & Chong, F. (2019). User-generated content and its effect on technical communication. Guest Editorial. *IEEE Transactions on professional Communication* 62(4) 315-317

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# World-Traveling to Redesign a Map for Migrant Women: Humanitarian Technical Communication in Praxis

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By Gabriel Lorenzo Aguilar


## ABSTRACT

**Purpose:** Humanitarian audiences are inaccessible to our traditional methods of research. Audiences like migrants often rely on technical communication to find humanitarian aid; however, there are few methodologies that can help us improve materials for them. This project explores world-traveling to demonstrate how the methods of other fields can help us take a proactive approach in critiquing and improving the technical communication from humanitarian operations.

**Methods:** World-traveling is the practice of seeing through another's eyes to anticipate what they may need (Lugones, 2003). It calls us to travel from our privileged "worlds," spaces we inhabit as scholars, into the worlds of vulnerable populations. The practice helps researchers understand the worlds of marginalized populations and help them. I world-travel to migrant women in an archive to improve a map that migrants use to find water in the Arizona desert.

**Results:** World-traveling allowed me to anticipate problems. I found that migrant women are at a much higher risk of death by exposure than men and that the current maps of water hide this risk. I redesigned the map with the intent to lessen the risk of death by exposure for migrant women. The redesign made it clear that women are at risk of a certain harm while also taking steps to humanize the women displayed on the map.

**Conclusion:** World-traveling allowed me to show migrant women the increased risk of death by exposure through a redesigned map. The result is more useful and humane technical communication.


**KEYWORDS:** Humanitarian Technical Communication, World-Traveling, Transnational Feminism, Undocumented Migrants

## Practitioner's Takeaway:

- Technical communicators should recognize humanitarian organizations as important sites of our work.
- This study introduces world-traveling as a praxis.
- The study also brings awareness to migrants' needs on the U.S. border and beyond.
- The results of the study provide strategies for redesigning maps for migrants at borders.

*"Thus, the example always needs to be interpreted; it never stands in our face, showing us anything without intervention."*

-Maria Lugones in Pilgrimages/Peregrinajes (p. 27).

## INTRODUCTION

It is difficult to study technical communication from humanitarian operations. The audiences often consist of the most vulnerable in the world (migrants, refugees, and asylees), populations that don't stay in one place for long. The humanitarian organizations that help these populations are wary of researchers—and rightfully so. To distribute humanitarian aid requires trust in the community; the intrusiveness of primary research can disrupt community trust between people and humanitarian operations while the ephemerality of people in dire need makes secondary analyses an inconsistent method. In short, if our field wants to fully engage with improving the technical communication at humanitarian operations, we need to find other ways to study them. Technical and professional communication (TPC) needs to look beyond our conventional methods in primary and secondary research to critique and improve the technical communication that comes from humanitarian contexts.

But how do we know if a problem exists in the first place? Humanitarian operations often don't wait for a communication problem before they act (Mays, Walton, & Savino, 2013) nor do they rely on what Ramler (2021) calls "postadoption feedback" (p. 346). The idea is that marginalized populations often can't provide user feedback on a technology in the same way that more conventional audiences like students or consumers might. Anticipation of problems from keen technical communicators is key in certain contexts. In Ramler (2021), she explains that "emphatic reach," an ethical vision that "enables writing for future audiences," is a method she uses through a queer framework to anticipate the problems that queer audiences might face when using social media platforms (p. 347). It is a writing for the future with recognition that waiting for a postadoption by marginalized audience is ineffective in certain circumstances. Ramler (2021) understands that there are certain contexts in which we must be proactive. I believe humanitarian contexts meet such criteria. To answer the question at the beginning of this paragraph: many times we don't know if a problem exists but we can enact a proactive, prepared and response approach to get ahead of potential problems in humanitarian operations (Mays et al., 2013; *Principles and Good Practice of Humanitarian Donorship*, 2003; Walton, Mays, & Haselkorn, 2016).

I want to demonstrate how I recognized and improved upon a potential technical communication problem at a humanitarian operation, Humane Borders (HB). HB distributes water to migrants via 80 water stations throughout the desert. Not only does HB distribute water, but they also create materials such as maps that can help migrants find water. However, these maps could be problematic because they flatten the diverse migrant population into singular, fixed points of data. Now, in more conventional situations (like in the classroom, industry, or government), researchers could use traditional methods to improve materials based on some type of feedback from what we would traditionally call a user: we could set up surveys, interviews, user experience workshops, focus groups. However, as I have come to experience, when we need to improve the technical communication for an audience as vulnerable as migrants, there are often few avenues to collect data. I have been told "no" many times by humanitarian organizations when I ask if I can study the technical communication sent out to migrants, refugees, and asylees. The responses I receive are mostly on the lines of "migrants are too vulnerable to give informed consent" and "refugees are in a situation where it can come across as unethical to present yourself as a researcher as opposed to a translator or volunteer." I looked outside TPC to see how other fields circumvented problems of methodology such as the ones I came across. World-traveling, and its situatedness in transnational feminism, offered one solution.

This project adopts transnational feminist Maria Lugones' (2003) theory of world-traveling to redesign a map of water stations for migrant women crossing the Arizona desert. World-traveling specifically, and transnational feminism in general, allows me as a researcher to gather data from an audience of migrant women who cannot be researched through interviews, ethnography, or other direct forms of study because many are deceased or in a vulnerable position where researchers are not allowed to directly engage with them. The aim of this adoption is to demonstrate to TPC the value of adding world-traveling to our

catalogue of appropriate research methodologies; doing so, justly, can help us create and critique technical communication for audiences who otherwise would remain inaccessible.

I inhabit both a privileged and a marginalized world. I am a person of color from a very marginalized undocumented community, a Chicano from the barrios of the Rio Grande Valley of South Texas—one of the poorest and least educated places in the country. I have world-traveled to survive; it is one of the reasons I wrote this article. However, I am also an inhabitant of a privileged world. I am a scholar and researcher, like Lugones (2003) and so many other people of color in academia, while also an inhabitant of a marginalized world. I have been trained in Western institutions. I write in and for Western audiences. My world-traveling will look different than your world-traveling, and there is much room for addition and critique. In fact, Lugones (2003) encourages it. There is room to build upon world-traveling as, at face value, it can overlook critical intersections of identity, particularly when it comes to race. The redesigned maps I made in this project are not perfect; my own practice of world-traveling is not perfect. There will be a heuristic at the end of this article that can help researchers understand how to world-travel that includes guiding questions that can help researchers locate themselves in their own worlds. While this heuristic is ever evolving and open for revisions, I hope readers can understand the value of the praxis and look to build upon an addition that could very much have our field help in humanitarian contexts.

## TPC AND WORLD-TRAVELING: SIMILAR GOALS, DIFFERENT METHODS

As more scholars of color from marginalized communities join academic conversations in technical communication, critical questions arise about how to include marginalized populations in our studies. Scholars such as Godwin Agboka, Natasha Jones, Cana Uluak Itchuaqiyaq, Emily January Petersen, Rebecca Walton, Jared Colton, and Steve Holmes among many others investigated how to "ensure that groups and individuals receive equal opportunities and are not marginalized and disenfranchised" (Jones, 2016, p. 472). Social justice as an approach in technical writing has led us to new findings in the field such as the recognition that marginalized communities inform technical communicators (Agboka, 2013) and that this information is crucial in making communication more accessible and less oppressive to the most marginalized of communities (Colton & Holmes, 2018). Thus, we arrived at a good working definition of social justice technical communication:

> Technical communication [that] investigates how communication broadly defined can amplify the agency of oppressed people—those who are materially, socially, politically, and/or economically under-resourced. Key to this definition is a collaborative, respectful approach that moves past description and exploration of social justice issues to taking action to redress inequities (Walton & Jones, 2018 qtd in Jones, 2016 p. 347).

There are key concepts to take away from this definition. The social justice turn pushes researchers to not only think about ways to amplify agency but also to act in socially just ways. There is a call for theory and praxis that has been demonstrated by many during this social justice turn. One of the key examples comes from Agboka (2013) where he theorizes the social justice potential of localization while applying this theory to a case of a marginalized group (Ghanaians) being harmed by mistranslated sexuopharmaceuticals. The result was an advocacy for considering social and cultural factors when translating to another language. What Agboka (2013) demonstrated, and what many in the social justice turn demonstrate, is that we can be facilitators of agency for the marginalized. We do not speak for them but instead find avenues that amplify their agency to help reduce risks associated with marginalization.

Like much of the social justice work in TPC, world-traveling, and its location in transnational feminism, is invested in amplifying the agency of marginalized communities. Broadly, transnational feminism unflattens people of color's experience in data, an unflattening that those in TPC might describe as an amplification of agency. For example, Mohanty (2003) finds that Western feminist scholars objectify displaced peoples by haphazardly engaging in "Methodological Universalisms" or "Women's Oppression as a Global Phenomenon" (p. 33). Researchers can portray the harmful experiences of displaced people, and women of color in particular, to be universal. The solutions to those problems are then also portrayed as universal.

Lugones (2003) spends some time foregrounding world-traveling in her experiences as a woman of color in academia. Many of the white men in her field saw the contributions of her colleagues of color as impoverished and in a state of sameness: the work of one woman of color is the work of all women of color, essentially.

Both technical communication and world-traveling argue against the flattening of people, albeit they take different approaches for different reasons. World-traveling theorizes against flattening through experienced-based, as opposed to empirically based, research. In this, it echoes social justice and feminist technical communication that have included experiences as a valid form of data collection (Petersen & Walton, 2018). However, experienced-based research in TPC is often conducted by scholars who have access to the audiences they are researching and are done in situations in the classroom, workplace, or industry. For example, while authors like Agboka (2013) and Jones (2016) use experience-based research to advocate for more inclusion of marginalized participants in TPC, some of their findings depend on the ability to reach their audience in conventional ways like interview, ethnography, case study, secondary research, and other methodologies in which a researcher can collect data directly from an audience. Similarly, Cui (2019) applies experienced-based feminist theory, Ratcliffe's (2005) rhetorical listening, to improve students' class-cultural communication and multimodal experiences in the classroom—again focusing on a traditionally researchable audience (the composition student) in an accessible location (the classroom). In contrast, world-traveling allows researchers to collect data from audiences that can't be reached through traditional methodologies.

## WORLD-TRAVELING TO INDIRECTLY COLLECT DATA

Before this section explains world-traveling, I'd like to highlight some concerns scholars have over world-traveling and its privileging of whiteness. Lugones' (2003) interpretation of world-traveling fails to critically engage with race; however, because her endeavor is open-ended, scholars can critically include race into the conversation. Ortega (2016) promotes the idea of a "*critical* world-traveling" which takes into account the problem of whiteness and privilege that Lugones (2003) overlooked (p. 141). Essentially, many have critiqued world-traveling for its failure to recognize how the inherent privileges of certain people in communities of color allow them to world-travel more so than others (Lugones' (2003) claim that one must be playful when world-traveling can come across as haphazard. We tend not to think of playfulness when researching the oppression of groups of people). Whiteness, for example, promotes the world-traveling of white-passing, or lighter skinned Latinxs while their dark-skinned counterparts are more restricted. Blackness can be erased when we world-travel as the gatekeepers of the dominant worlds can filter which world travelers they find appealing.

Because world-traveling is a new methodology to our field, this particular project will focus mostly on Lugones' (2003) initial understanding of world-traveling and will not fully engage with critical world-traveling. This is not to say that I was not wary of the problematics of world-traveling (there are some redesign features where I take race and whiteness into account); however, I wanted to showcase the pragmatics of world-traveling to the field and then allow for open-ended conversation on how to improve our engagement of the methodology. Future projects will better critique world-traveling and its application in TPC.

### Lugones and World-Traveling

World-traveling is the practice of visiting other people's "worlds," a figurative or physical place where people, alive or dead, inhabit. Lugones (2003) purposefully leaves "world" broadly defined and states that "I do not want the fixity of a definition at this point, because I think the term is suggestive and I do not want to close the suggestiveness of it too soon" (p. 83). But it's important to know that we, as people with multiple identities, all inhabit worlds. Some of our worlds are intimidating to others, especially if we are privileged in our world; some people are content in staying in their own worlds and never travel to others; and some people *must* travel to other people's worlds for survival (Lugones, 2003). In essence, the act of traveling can come from a privileged space or a space of survival depending on the other worlds we inhabit and the identities we possess. A white middle-class man scholar may be content to stay in the world that welcomes white middle-class men scholars; this person may never travel to the worlds of, let's say, the brown custodial

staff that cleans the physical places of the privileged world, of his office space; this person may never travel to the worlds of his working-class students where there are invisible tensions that pose the privileged person as a gate keeper to privileged worlds. Both worlds, whether it is physical as in the office or not-so-physical as in the tension between the scholar and student, *must* be visited by the less privileged for survival. The brown custodial staff must enter the world of the scholar in order to survive: there was an interview process, there is a protocol for his cleaning, there is an understanding of what's important on the scholar's desk so as to be extra careful while cleaning. The working-class student must enter the world of the scholar to survive: there is a power dynamic in which the student needs to meet the scholar's expectations to pass the course despite the situation that makes it incredibly difficult for working class students to do so.

According to the text, all people can world-travel regardless of their privilege (or lack thereof),[1] but certain people can travel in harmful ways. Sometimes traveling is willful and at other times not (Lugones, 2003, p. 90). I interpret that willful traveling is usually done by those who are privileged in their worlds—they can *choose* whether or not they travel. Lugones (2003) warns the inhabitants of privilege worlds about their dangers of traveling; dangers not so much in that their traveling can harm their own sense of security in their own world, but danger in that traveling from a privileged world can lend a privileged person an imperialist drive. There is a risk that an "agonistic traveler" will visit the world of a marginalized person with a conquest in mind (Lugones, 2003, p. 87): to assimilate the other world to the standards of the privileged, to enact what Mohanty (2003) would call a Methodological Universalism, to consider the experiences of the marginalized in objective ways, to flatten. Therefore, it takes incredible reflexivity and what Lugones (2003) calls "playfulness" for a person from power to travel to the world of marginalized people (p. 87). That privileged person must visit with a playful attitude, an approach that welcomes uncertainty with an "openness to surprise" and a "metaphysical attitude that does not expect the [marginalized] world to be neatly packaged" (Lugones, 2003, pp. 88–89).[2] In other words, to return to my epigraph, being playful is a necessary skill of the privileged traveler because it gives us the attitude to understand that these marginalized worlds are often distorted and manipulated by dominant powers—"it never stands in our face, showing us anything without intervention" (Lugones, 2003, p. 27). Further, reflexivity and playfulness allow us to see past the objectivity that is often presented by Western (re)production of marginalized worlds; we should be open to the uncertainty and surprise that people in marginalized worlds are harmed in ways other than those depicted by Western worlds.

To world-travel from worlds of privilege to marginalized worlds is to collect data in untraditional ways.[3] The term "playfulness" is used consistently in Lugones (2003) as a characteristic of being open to surprise and to be unconquering as we visit other worlds. Lugones (2003) clarifies that playfulness here is not about competition or winning; rather, it's about accepting that our perspectives of marginalized worlds are often shaped by dominant worlds to make the marginalized seem lesser and other. Lugones' (2003) world-traveling gathers information in valuable, yet indirect, ways to understand the needs of marginalized peoples. As she puts it, "we inhabit 'worlds' and travel across them and keep all the memories" (Lugones, 2003, p. 90). Memories are the keepsakes one gathers when world-traveling: a playful

1 Lugones (2003) has received criticism over her assertation that all people can world-travel as it can overlook the importance of race, whiteness, and Blackness in the ability to travel and enter another's world.

2 Playfulness may come across as an inappropriate term especially in the context of my writing about dying migrant women. The term "playfulness" is used consistently in Lugones (2003) as a characteristic of being open to surprise and to be unconquering as we visit other worlds. Lugones (2003) clarifies that playfulness here is not about competition or winning; rather, it's about accepting that our perspectives of marginalized worlds are often shaped by dominant worlds to make the marginalized seem lesser and other.

3 My claim here is not to say that those who travel from marginalized worlds do not collect data; surely, the brown custodian who works for the middle-class white man scholar has collected data about this world of power: there is data collection on how privileged worlds orient their spaces, what people in privileged worlds expect in their services, and what people in privileged worlds find valuable or invaluable in their worlds. The brown custodian collects this data and distributes it in the marginalized worlds they visit. What I am claiming is that because we, as scholars of TPC, to some extent inhabit and frequently visit worlds of power (Lugones, as both a scholar and woman of color, included), we should understand how we gather data from marginalized worlds. Understanding can help TPC be better, and more ethical, in our data collection from marginalized worlds and its peoples.

traveler experiences the norms and harms of those that inhabit a certain world and holds them as memories as that traveler visits other worlds. I interpret Lugones' (2003) keeping of memories as a form of data collection in which she gathers information from marginalized and dominant worlds to make theories about the relationship between and among the worlds she visits. To demonstrate her data collection, Lugones (2003) sets up two worlds and their colonial relationship, the world of the white and privileged (a world of power) and the world of women of color in the U.S. (the marginalized). Lugones (2003) acknowledges that she inhabits and travels between both of these worlds.[4] She can see that those who inhabit the white and privileged world, people who she specifically addresses as "White/Anglo" (Lugones, 2003, p. 79), do not world travel to the worlds of the marginalized or, if they do, travel in imperialistic ways. They fail to identify with those who they find subordinate; they fail to engage in a playful exploration and ignore the marginalized unless they need the experiences of the marginalized to advance their careers. However, as a person who also inhabits both the privilege and marginalized worlds, Lugones (2003) does travel between them. She investigates the ways the privileged worlds contribute to the marginalization of certain people. For example, Lugones (2003) studies how White/Anglo people ignore women of color and reports on the harm felt by those in marginalized worlds she inhabits. These keeping of memories, I argue, are a form of data collection not based on empirical methods but through the transnational feminist method of world-traveling. Lugones (2003) engaged in a playful attitude to explore both worlds, made the effort to travel back to the marginalized after inhabiting the privileged world, and traveled once again to the privileged world to publish her findings (all steps in her collection and publication of data).

Lugones (2003) engages with practices of world-traveling to show the reflexivity it takes for those in privileged worlds to understand the power dynamics when we stay in or travel from our own world and when we decide who gets to enter our world or if others get a say if we visit theirs. All of us inhabit our worlds and many of us world-travel. Because of our involvement in academia (be it as graduate students, junior faculty, full-time professors, or administrative and other staff), we do inhabit a powerful world, a privileged world. Because many of our investments as scholars are to help marginalized people (and, in turn, marginalized worlds), with an awareness of what world-traveling overlooks in terms of race (Ortega, 2016), we must practice the same reflexivity that Lugones (2003) demonstrates in that we are coming from worlds of power and can travel to marginalized worlds through playful and helpful ways.

World-traveling can help us research inaccessible audiences. There can be, and most certainly is, a study that collects data on how people of color are marginalized and harmed by Western researchers. However, even in the most comprehensive studies, there are certain people who cannot participate through traditional methodologies because of their vulnerability. Lugones (2003) not only collects data through world-traveling to people that can be reached by traditional methods, she also world-travels to people who are not alive. For example, she world-travels to the world of her deceased mother to better understand why their relationship was strenuous when she was alive. Through world-traveling, Lugones (2003) discovers that her mother was a plurality of identities; that at once, her mother inhabited a marginalized world that made her subordinate to the worlds of the powerful while also performing a stereotype expected by the worlds of the dominant. World-traveling helped Lugones (2003), through a playful attitude, understand that her mother was at times performing for the expectations of agonistic travelers—a performance that often led to conflict between them as her mother often critiqued Lugones' (2003) for her lesbianism and Lugones (2003) in turn "abused" her mother back (p. 82); the abuse mentioned in the text means that Lugones arrogantly perceived her mother to be a servant without agency to dominant worlds. This insight provided a conclusion for Lugones (2003). Her mother, like so many other women of color, was held to an unfair standard and was performing that standard for survival. Lugones (2003) would not have realized that her mother was a victim of the privileged worlds, but world-traveling helped her understand. This is valuable data that Lugones (2003) takes with her to the powerful world as scholarship, not for the advancement of her career, but as a contribution in the hopes of helping other scholars avoid imperialist world-traveling.

4 It's important to note that while Lugones does inhabit worlds of power and marginalized worlds, she is still subjected to marginalization in the worlds of power. She is still a woman of color nonetheless and is subservient in these powerful worlds.

# Humanitarian Technical Communication in Praxis

## The Limitations and Potential Harms of World-Traveling

While Lugones (2003) may have given a name to the practice of world-traveling, she did not invent it. World-traveling has existed before, and the harm of imperialist and colonial world-traveling has been well documented. Some may have seen the harms as cultural appropriation, theft of a marginalized population's intellectual property or intellectual resources, or even as racial tourism—visiting the headspaces of the marginalized as a tourist, to gawk at oppression without an engagement to resolve oppression and only to tell others in more privileged worlds how bad it is *over there* (Vats, 2014). It is true that Lugones (2003), despite her warning of imperialist, agonistic, world-traveling leaves too much room for others to world-travel in harmful ways. However, I argue that because she has given it a name and an open-ended endeavor to improve it, our field can better understand the limitations and harms of world-traveling and ensure we are helping much more than we are harming.

One limitation is to remember that world-traveling is a praxis in a field that values material contribution. A recurring grievance of transnational feminism and world-traveling is the academic acceptance that describing the situations of the marginalized back to privileged worlds is enough (Lugones, 2003; Mohanty, 2003). Thus, if we want to world-travel, we must do so with an intervention that improves the situation of the marginalized. In this project, for example, my world-traveling led me to redesigning a map for migrant women.

Another limitation is that the praxis of world-traveling can, even unintentionally, be more for those in privilege worlds and not for those residing in the margins. Lugones (2003) reports that those who world-travel can attempt to transform a situation in the worlds of the marginalized only to leave it when they return to their privilege world. Transnational feminism has well documented this phenomenon (Mohanty, 2003). In today's terms we may call it virtue signaling, a half-hearted attempt to display our awareness of an injustice without a full engagement of the situation. In academia, the temptation for many is to publish about their world-traveling without ever returning to the site—as soon as the scholar gets another line on their CV, it's on to the next project. My upcoming intervention is one I have been working on for years in tandem with a humanitarian organization. I plan to donate my research and redesigns to the organization while also improving my praxis of world-traveling in future redesigns and interventions.

The final limitation I'd like to note is that world-traveling is a still a way *to work with what we have*. Researchers need to have information about a demographic in order to world-travel. And that information influences how a researcher world-travels and the extent of the intervention. For example, I first studied an archive of deceased migrants for months before feeling comfortable to world-travel to a specific demographic. That archive gave me specific information about a migrant's sex, age, cause of death, and name. Other information such as country of origin, sexuality, and race were not catalogued. Thus, my world-traveling focused on the available information to listen to the needs of a specific demographic. I found, out of many, that migrant women were not made aware of the risks of exposure.

There is great risk in harming marginalized worlds in world-traveling. Haphazard scholars have done harm before and after Lugones (2003) gave name to the praxis. However, because we have a name, an ethics, and the room to critique and improve world-traveling, there is much we can do as practitioners and researchers in TPC to genuinely improve the worlds of the marginalized. We must keep in mind the limitations to do so. World-traveling requires us to intervene in some way while ensuring our interventions are for the marginalized and not for our own personal gain. Our interventions must also be ever-evolving, always attentive to possible improvements or changes. Finally, our world-traveling is limited to working with what we have, the information available. With these limitations in mind, I'd like to demonstrate my world-traveling.

## CASE STUDY: THE MIGRANT WARNING POSTER

This section explains my redesign of Humane Border's "Nogales Migrant Warning Poster" (Figure 1) to demonstrate how the field can world-travel to create materials for the needs of undocumented migrants—an audience that is difficult to traditionally research. The Migrant Warning Poster is a map that is printed and distributed to migrants. Humane Borders (HB) is a humanitarian organization based in Tucson, Arizona that distributes water to migrants in dire need via 80 water stations strategically placed all throughout the

desert. Water stations are located based on the number of deceased migrants that Humane Borders has tracked over the last 21 years. The data is publicly available through Humane Border's database, the Map of Migrant Mortality, in which the public and researchers alike can search from over 3,000 deceased migrants with filters such as name, gender, year of death, cause of death, county of discovery, land management, and land corridor. The Map of Migrant Mortality (shown in Figures 2 and 3) is weekly updated and is the primary reference as to where Humane Borders places their water stations. The Map of Migrant Mortality feeds the data found on the Migrant Warning Poster. Technical communicators transfer the data from the Map of Migrant Mortality to the Migrant Warning Poster to show potential migrants the location of both water stations and deceased migrants along with other information about traveling through the desert.

## Usability and Map Making

While it is almost impossible to gather user experience directly from populations in humanitarian contexts, this project directly looks at Humane Borders' map through a rhetorical lens that rejects a flattened, objective depiction of people in the hopes to promote usability. I take Welhausen's (2015) definition of rhetorical map making along with Dragga & Voss (2001, 2003) and Propen (2007) to investigate how to promote humanity in my redesign. More is to be described in the case study, but Welhausen (2015) argues that what makes maps rhetorical is the omission of certain key geographical, bodily, and/or political information. Dragga and Voss (2001, 2003) find that maps can often omit the humanity of people in data, making it a rhetorical endeavor for technical communicators to add that humanity back through critique. Finally, Propen (2007) explains that usability goes beyond the individual user and in fact extends into the user's environment.

While well intentioned, Humane Border's map is a testament to Western positivism, what Lugones (2003) would call an "agonistic" perspective (p. 90). I find that the depiction of deceased migrants as rigid, fixed red dots come across as harmful to the migrants displayed on the map. Rhetoric and TPC have thoroughly shown that there is a stigma in presenting data: practitioners and audiences alike tend to turn away from data presented as rhetorical and complicated (Atherton, 2021; Dragga & Voss, 2001, 2003; Propen, 2007; Welhausen, 2015). It's easier to digest an "objective" dataset and to hold numbers as the authority-without-bias. However, real rhetorical work is at play between those who create and those who read materials created from datasets. Objective data creates an illusion of an objective situation and, thus, an objective response (Bacha, 2018; Haraway, 1988; Kimball, 2006; Welhausen, 2015). A response here might be "place more water where we find more red dots"—a solution that might seem intuitive until we find that those red dots are diverse and complex. A rhetorical approach to this map might find that there needs to be better depictions of the people that represent those red dots (Dragga & Voss, 2001, 2003). And with better depictions come more descriptive problems and more appropriate solutions (Propen, 2007). The red dot cannot stand for everything a person is or needs.

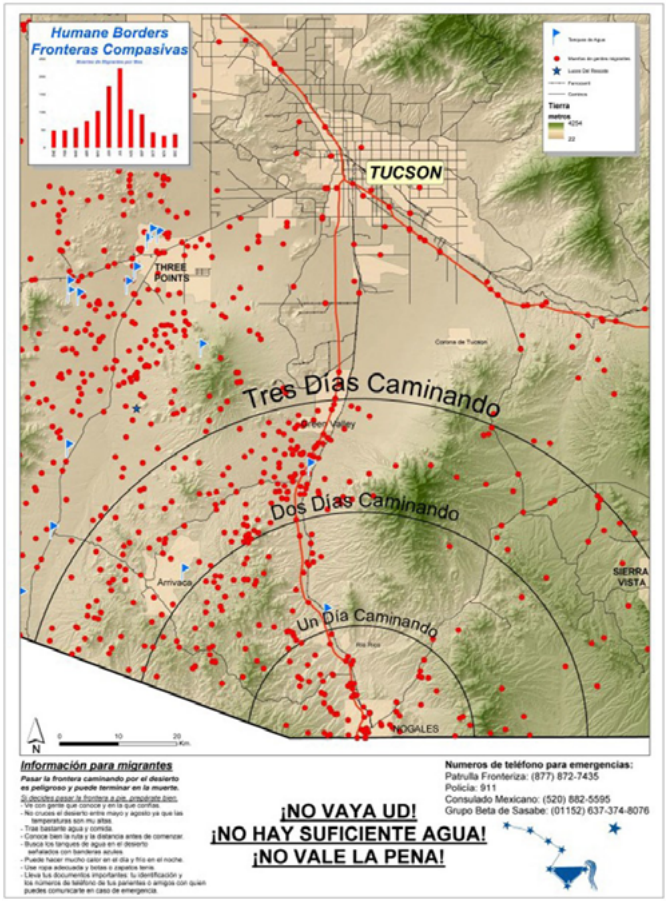


**Figure 1. Migrant Warning Poster**

I approached this map with both a TPC and world-traveling lens and found that those rigid, fixed red dots hide a reality that needs to be addressed. The Migrant

Warning Poster does not show that women are at an elevated risk of death by exposure when compared to men. According to my research on the Map of Migrant Mortality (the archive that feeds the warning poster), migrant women[5] are much more likely[6] than migrant men to die of exposure (dehydration, hypothermia, and heat-related deaths) across all corridors[7] of Humane Borders' water distribution. However, the current warning poster does not show that women are at more risk of death by exposure than men. I believe that a world-traveling lens towards the migrant women in the archive in a redesign can help make this more evident for migrant women. The redesign could show migrant women that they are more at risk of death by exposure, showcase how other factors like age and travel trajectory effect the likelihood of death by exposure, and also replace the rigidness of red dots to something that is more humane to the lives lost in the desert. This redesigned map could be printed and distributed along with the original map to ensure migrant women are able to see it.

A map can reproduce harm to people if translated through an "agonistic" perspective (Lugones, 2003, p. 94). The rigidity of red dots representing lives (-lost) in the Migrant Warning Poster does not exist in a vacuum. There was a careful design plan that translated the lives (-lost) found in the Map of Migrant Mortality to the Migrant Warning Poster. The dataset in this case does have information about deceased migrants that is not found on the Migrant Warning Poster: information such as name, gender, location found, cause of death, and year of death are omitted from the warning poster. The exclusion of this information is rhetorical because "the purpose of creating any map is to arrange select geographic content into an abstracted visual representation that emphasizes certain features and minimizes others (inclusion and exclusion) in constructing new spatial relationships that advance a particular understanding and interpretation of that space" (Welhausen, 2015, p. 268). In the case of the Migrant Warning Poster, the rhetorical decision was to exclude the name, gender, and location and time of death to advance the understanding that this information is not needed for a migrant to find water. What is supposedly needed for migrants is the approximate location of deceased migrants alongside blue markers of water. However, as I've argued through a world-traveling lens, not including this information hides that women are at an elevated risk of death by exposure than men and can reduce migrants' lives to a singular entry of data—both of which perpetuate violence by not warning a certain demographic of an increased risk and reducing the lives of deceased migrants into reproducible red dots.

The practice of world-traveling may reduce the harm of translating data from the Map of Migrant Mortality to the Migrant Warning Poster. The people who created the current Migrant Warning Poster approached deceased migrants in an agonistic way. The translation from archive to map reduced a diverse population to red dots. World-traveling to the people in the archive can help reduce the harm in that translation by playfully exploring the worlds of those in the archive, a practice that can allow TPC to create materials for inaccessible audiences.

I approached the original map with a wariness of objectivity. This wariness of what was presented led me to dig deeper into the demographics not shown in the original warning poster. There were many hidden crises in the data. Men are much more numerous than women in terms of bodies found (the ratio is almost 4:1); men are more likely to die of gunshot wounds or motor vehicle accidents while women are more likely

5 Note that there are three categories listed under "gender": male, female, and undetermined. The current iteration of the map of migrant mortality most likely determines gender on a person's genitalia (although this method is not specifically mentioned anywhere on Humane Border's website). People with penises are coded as male and people with vaginas are coded as female. The undetermined category is reserved for bodies that are too far decomposed to be accurately sexed. There is no mention of possible transgender migrants, and the argument to include transgender migrants in the data, while in support from this author, is beyond the scope of this project. Furthermore, I will report females as women and males as men. I believe women and men as categories further pushes the argument to diversify datasets.

6 I have found that across all corridors 63% of all found women have died by exposure compared to 34% of all found men. When looking at individual corridors, Sasabe has the largest gap between women and men's death by exposure with 100% of women dying from exposure compared to 23% of men; the smallest gap is in Sasabe with 53% of women dying from exposure compared to 38% of men.

7 A corridor is a sliver of Arizona in which a number of water stations are placed in the predicted trajectory of migrants' travels. Corridors are used in the creation of Migrant Warning posters as four of the most frequented corridors (Nogales, Lukeville, Sasabe, and Douglass) have been chosen by Humane Borders to represent water stations and deceased migrants. This project will focus on the Nogales corridor shown in the Nogales warning poster.


**Figure 2. Map of Migrant Mortality, the Archive (Page 1)**

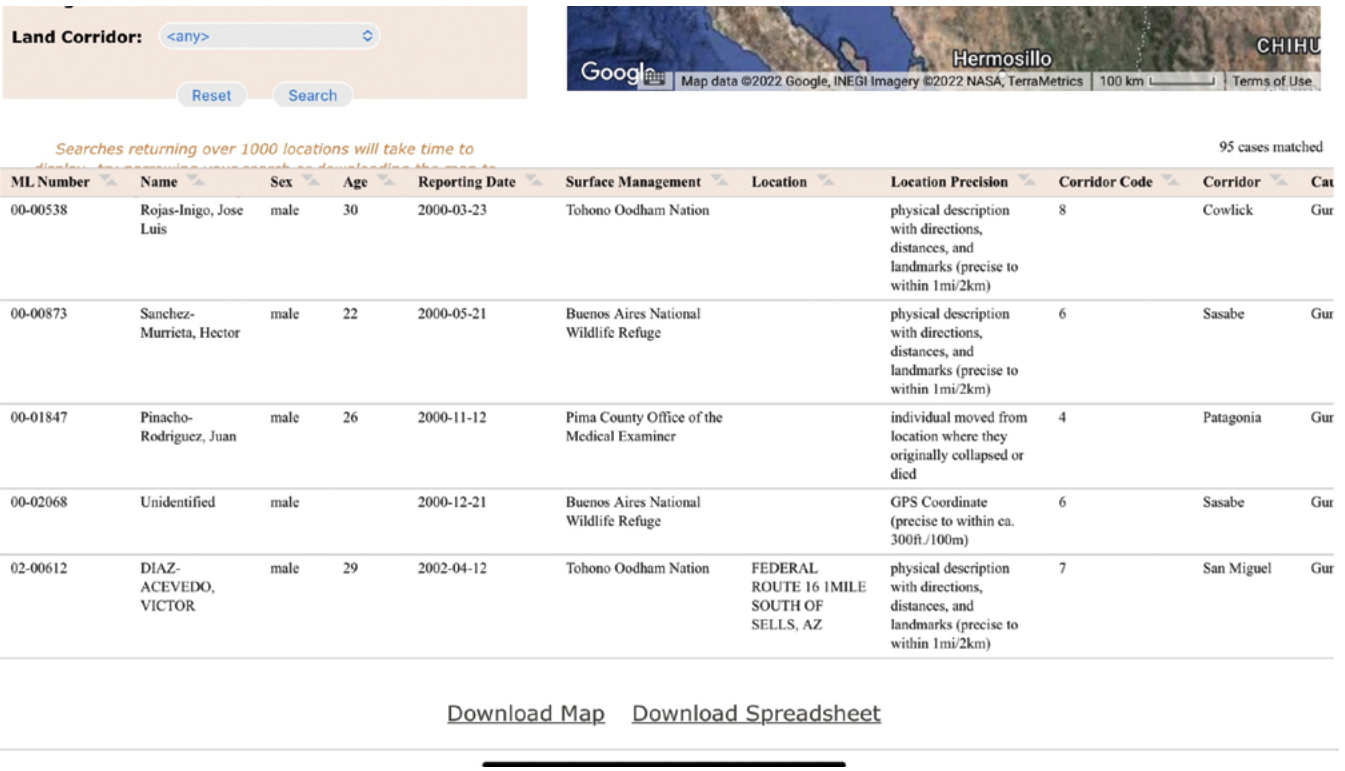


**Figure 3. Map of Migrant Mortality, the Archive (Page 2)**

to die of drowning and, in the focus of my redesign, by exposure. The repercussions of this redesign should not hold women's issues as the limit of world-traveling. If my focus were on redesigning this map with men in mind, this would still be a transnational feminist project as both women and men migrants are victims of displacement by the dominant Western world. Nonetheless, this project is focused on creating a new Migrant Warning Poster for women that shows migrant women the increased risk of death by exposure and hopefully provide information that can lessen that risk.

## My World-Traveling to Migrant Women

There was no usability testing when it comes to the Migrant Warning Posters. Unlike many other audiences in TPC, migrants are especially vulnerable and the organizations that help migrants are wary of academics. I've been respectfully told "no" many times by humanitarian organizations; however, I believe technical communication to be important work even for the most vulnerable of populations. I sat with the Nogales Warning Poster for years, sketching ideas as to how I can improve this map in valuable ways without the traditional feedback of an audience. The more I sat with the map, and the more I continued looking for other ways to collect data, the clearer transnational feminism became as one way to make a contribution. Rhetorically, this map can clearly be improved. We understand that the key to improving this map lies in the relationship between the involved rhetorical parties such as migrants, researchers, the public, and volunteers. However, the outlets to collect data on the migrants that use this map are just not there. This is an inaccessible audience.

The nameless, genderless red dots on the Migrant Warning Poster made me uneasy. I was uncomfortable with the idea that this was all that could be presented in a document crucial to the survivability of migrants crossing the Arizona desert. The objectivity in the Migrant Warning Poster presents lives(-lost) as a universal problem with a universal solution (Dragga & Voss, 2001, 2003). There are migrants dying here, so here we place water. In a practice of world-traveling, I explored the archive with the openness of surprise. I tried to imagine the diversity not shown by these red dots. What are their names? What are their genders? What are their nationalities and races? What are their ages? How are they harmed? How can I/we help alleviate some of that harm? I traced the data on the warning poster to its dataset, the Map of Migrant Mortality. This dataset is diverse. You can search the names, genders, ages, locations of death, causes of death, and years of death from a set of over 3,700 deceased migrants. It is evident that there is much difference in how migrants are dying that is simply not shown in the Migrant Warning Poster. Men and women[8] are dying at different rates and of different causes; people at varying ages are dying at different rates; people are dying of different causes according to different locations and trajectories. None of this information is presented in the Migrant Warning Poster.

## Choosing the Demographic

The migrant women's elevated risk of death by exposure is the specific demographic and context I chose to represent in a redesign. Although there are dozens of maps that could be redesigned from the Map of Migrant Mortality, migrant women dying of exposure stood out to me because of the astonishing rates women are dying when compared to men. While men are more numerous than women (I counted over 2,800 found men compared to 470 found women), the rate of death by exposure is 34% of all men compared to 63% of all women. The disparity is evident across all land corridors in Arizona with some places having 23% of men dying of exposure compared to 100% of women.[9] Nogales, the land corridor represented in the Migrant Warning Poster, has 37% of men die of exposure compared to 49% of women.[10] One may make the point that since both significant percentages of men and women are dying of exposure, why not create a map that shows the risk of death by exposure for all migrants? I believe that this approach to the redesign may hide the importance of theorizing through difference; that is, it's important that we recognize the difference in women dying at a higher rate than men.

After it became clear that migrant women are at an elevated risk of death by exposure, I was at a crossroads of where my redesign should go. After all, to draw upon common train of thought in TPC, the redesign is only as purposeful as it is useful. It is not enough to redesign

8 The Map of Migrant Mortality only regards gender in terms of male and female. I prefer men and women and would also add that there should be additional categories for trans- and non-binary people.

9 This land corridor, Berandino, saw 3 of 3 women die of exposure while 3 of 13 men died of exposure.

10 Nogales saw 25 of 51 women die of exposure compared to 107 of 286 men.

the poster with the same one-dimensional approach as the original. The new map must show potential migrant women the complexity of travel, death, and resources while at the same time fulfilling the spatial goal of a map (Welhausen, 2015). In other words, this new map has to put migrant women as the priority in accordance with what world-traveling advocates: it must be useful while at the same time not universalizing nor can it cause further harm: (Lugones, 2003; Mohanty, 2003)—harm not just in the sense that the map can hide the humanity of those depicted (Dragga & Voss, 2001) but also in the sense that this map can harm migrants by not informing them of the unique dangers of the desert. World-traveling, and the playfulness and reflexivity in its practice, helped me to redesign the poster in a way that can reduce both of these instances of harm.

## Anticipating Needs

I world-traveled to the migrant women in the archive to anticipate what they might need from a map. I imagined that the current Migrant Warning Poster might not give women the necessary information to survive. I tried my best to identify with these women, to "understand *what it is to be them and what it is to be ourselves in their eyes*" (Lugones, 2003, p. 96) while at the same time tasking myself with humanizing the archive in the way Dragga & Voss (2001, 2003) encourages us. In their eyes, I could see that the sea of red dots, scattered ubiquitously about the desert, was both intimidating and unhelpful—what could a migrant do with these dots? I found that offering the names, gender, ages, causes of death, and locations of death could help potential border-crossing women understand the unique dangers to them and others. Names give humanity and perhaps some insight into race and culture to those in the warning poster that could communicate the peril of crossing the desert (Hartman, 2008; Ortega, 2016); gender could relay the fact that women are at an increased risk of death and should take additional precautions before crossing; age shows that it is not only older women dying of exposure but also young women and girls; causes of death and locations of death reflect how different parts of the Nogales land corridor put women at different risks of exposure (some areas may make migrant women more susceptible to dehydration while others to hypothermia, for example). All of these considerations diversify the original map by showing that people are harmed in specific ways.

## Rationale of Visual Design and Functionality

The redesigned map demonstrates how one could improve technical communication through world-traveling to the migrant women in the archive. There are 26 women who have died by exposure in Nogales according to the Map of Migrant Mortality. My goal is to humanize these 26 women while making it clearer to future migrant women that there is an increased risk of dying by exposure. The redesign was made through Photoshop[11] where I made a 1:1 copy of the Nogales land corridor through Google maps when compared to the Nogales land corridor shown in the original Warning Poster. I recreated the time-elapsed markers (Un Dia Caminando, Dos Dias Camindando, etc.) using the original Poster for reference. Then came the question of how to improve the rigidity and dehumanizing red dots. I considered Propen's (2007) call that we should consider the environment around the people in our rhetorical critique. I opted for three zones that grouped the highest concentration of women: grupo amarillo (yellow zone), grupo morado (purple zone), and grupo rojo (red zone).[12]

Organizing deceased migrant women in zones can better allow potential migrant women to see the most perilous parts of the desert while allowing for the redesign to humanize the 26 deceased women. The original Poster was overwhelming as the sea of red dots made it difficult to distinguish how different parts of the desert effected migrants differently. However, by organizing these women in zones, it becomes clearer that there are different risks associated with the trajectory of travel. For example, all the women who have traveled eastward died of hyperthermia (hipertermia) while dehydration (deshidración) and heat stroke (golpe de calor) become factors when migrants travel westward. This information is valuable in the preparation migrants need when traveling. The other benefit to the groups is the potential to humanize the women in

11 Disclaimer: I am not a graphic designer nor am I an expert in Photoshop. However, while the aesthetic of this redesign needs much improvement, I believe the major contextual changes between the original Warning Poster and my redesign is demonstrative enough where a technical communicator can apply the practice to their own redesign.

12 Note that these colors don't present anything meaningful beyond their intended function. They are a tool to organize the many bodies that were once represented by red dots.

the archive. I replaced the red dots with a numerical system where each woman is assigned a number; that number corresponds with a table on the backside of the redesigned poster. A potential migrant could see a number 1 in the yellow zone on the frontside and then follow that information to the backside to see the name, age, cause of death, and year found. Not only are these 26 women humanized in this redesign, but potential migrants are also given valuable information on the age and cause of death of that person—information that can help a migrant better prepare for travel.

### Comparing the Redesign and Original Maps

I'd like to compare the original map and my redesign side-by-side. I mentioned the one-dimensional approach of the original Poster—how the flatness of the red dots and blue flags rhetorically argued that water and the location of deceased migrants are the only important information (Atherton, 2021; Kimball, 2006; Welhausen, 2015) while the red dots practice a Methodological Universalism (Mohanty, 2003). At first glance, my redesign might come across as one dimensional. Afterall, the red dots are replaced by Arabic numbers and the blue flags remain. However, I'd argue that my redesign unflattens the harm and solutions in a way that is more useful. In my world-traveling, I saw that migrant women's harm was universalized by the red dots. A migrant woman could look at the original Poster and not see the intricacies of how travel and the desert led to different causes of death. My redesign hopefully communicates the specific harm that migrant women can face on their travel. My world-traveling helped me anticipate that migrant women may need to know how gender, trajectory, age, and year become a part of the risk of crossing the Arizona desert. For these reasons, I argue that, while my redesign is still constrained to the physical dimensionalities of a printed map, it unflattens the people in the map in a way not found in the original poster. I hope to donate my redesign to Humane Borders in the near future.

## DISCUSSION AND CONCLUSION

A playful attitude allowed me to go through the archive with an openness to be surprised. I put aside the mission statement of Humane Borders and their description of the needs of migrants; I put aside my own expectations of what I might find in the archive. I tried my best to *listen* to those in the archive and anticipate what could

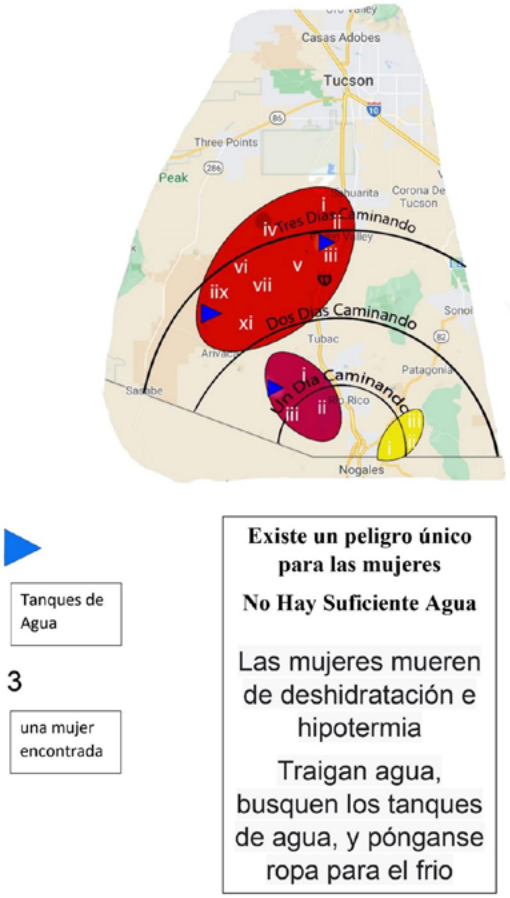


**Figure 4. My redesign frontside**

help. I world-traveled to many different populations, some of which are not represented in the archive—men, women, pregnant people, children, the elderly, the young, those in the LGBTQ+ community, the problems of whiteness and Blackness and of race in general, and all the intersections of identities that cross borders with their border crossers—and found that each demographic had something to say that wasn't represented in the original poster. For example, I went through many drafts of a redesign based on my world-traveling. I originally planned to redesign a map for those who are pregnant or with small children to show where one can find baby-safe water and diapers; I was also invested in a redesign showing men that there is a risk of motor vehicle accidents in certain areas as the original poster fails to show how some water stations are only accessible after crossing a busy road. The point is that the playfulness from world-traveling can give technical communicators

**Grupo Amarillo**

| Numero y Nombre | Edad | Causa De La Muerte | Año Encontrado |
|---|---|---|---|
| i. Tomasa | 29 | Hipertermia | 2009 |
| ii. Juana | 41 | Hipertermia | 2000 |
| ii. Erica | 20 | Hipertermia | 2005 |
| iii. Silvia | 23 | Hipertermia | 2006 |

**Grupo Morado**

| Numero y Nombre | Edad | Causa De La Muerte | Año Econtrado |
|---|---|---|---|
| i. Araceli | 33 | Deshidración | 2019 |
| ii. Josefina | 40 | Golpe de Calor | 2003 |
| ii. Maria | 31 | Hipertermia | 2008 |
| iii. Blanca | 31 | Hipertermia | 2007 |
| iii. Sin Nombre | Sin Edad | Golpe de Calor | 2002 |
| iii. Mayra | 23 | Deshidración | 2008 |

**Grupo Rojo**

| Numero y Nombre | Edad | Causa de la Muerte | Año Econtrado |
|---|---|---|---|
| i. Rosaura | 34 | Hipertermia | 2008 |
| ii. Reyna | 29 | Golpe de Calor | 2013 |
| iii. Mireya | 22 | Golpe de Calor | 2013 |
| iv. Sin Nombre | Sin Edad | Hipertermia | 2009 |
| iv. Blanca | 22 | Hipertermia | 2007 |
| iv. Estela | 21 | Hipertermia | 2005 |
| v. Lucia | 32 | Hipertermia | 2005 |
| v. Azucena | 39 | Hipertermia | 2007 |
| v. Alicia | 42 | Hipertermia | 2004 |
| vi. Blanca | 34 | Hipertermia | 2004 |
| vi. Ingrid | 19 | Golde de Calor | 2006 |
| vii. Carmen | 22 | Hipertermia | 2004 |
| vii. Lydia | 27 | Golpe de Calor | 2001 |
| viii. Ernestina | 27 | Hipertermia | 2010 |
| viii. Josseline | 14 | Golpe de Calor | 2008 |
| viii. Rosalinda | 38 | Hipertermia | 2010 |

**Figure 5. My Redesign Backside**

another tool to *listen* when our audiences cannot speak or be heard in conventional ways.

Reflexivity allowed me to understand that the people in the archive are subject to academic fixation and reproduction. Understanding world-traveling means understanding how predatory dominant worlds can be over the marginalized. This predation doesn't have to be deliberate or malicious, but it happens through the perpetual reproduction of data without the reflexivity that this reproduction may be harming the people in the

data. The original poster was not reflexive. It flattened thousands of diverse people into red dots and then printed the map in mass in its distribution to migrants. I hopefully demonstrated what a reflexive researcher could accomplish. I understood my status in a dominant world and how my dominant world kept reproducing harmful data like the one found in the poster. My solution was to halt a 20-year production cycle by looking deeper into the purpose of the poster: who was it for, after all? It is not for researchers but for the migrants who use the map to find water. My reflexivity, practiced through world-traveling, gave me the insight to put migrants first.

My redesign of the Nogales Warning Poster and my practice of world-traveling to migrant women should not be considered a perfect demonstration. It's far from it. There are constraints. I found questions through my world-traveling that could not be addressed with the information in Humane Borders' archive; for example, I anticipated that country of origin may be useful for migrant women considering that migrants at the border come from all over Latin America—a practice that could better highlight the intersections of race in these countries. However, I did not have that information. As valuable a methodology world-traveling is when we consider inaccessible audiences, it is still another way to *work with what we have*. It is a real, grounded methodology put forth by transnational feminists in that we can make valuable contributions in so much as we have valuable information. In other words, world-traveling is not make-believe as some skeptics might claim. It is a way to see through another's eyes to anticipate what they may need (Lugones, 2003), but what we anticipate can only be fulfilled by the resources we have as researchers. What I hope my demonstration sparks is for other technical communicators to world-travel and to practice transnational feminism in places where we can't access an audience in traditional ways; the practice could lead us to questions and solutions that we may not have considered otherwise.

## A HEURISTIC TO HELP OTHERS GET STARTED

When looking at a potential application of world-traveling in humanitarian contexts:

TPC-Centered Prompts

- What is being said about the population depicted in this data set?
- What is not being said?
- Is there an archive that feeds this data set?
- Where can I go to find out more about the population?
- What worlds are described by all the available information?

World-Traveling-Centered Prompts

- What is the world(s) I inhabit?
- Does my world have an imperialistic drive? Does it conquer the worlds of the marginalized?
- What approaches of a playful attitude can help me navigate that imperialistic drive?
- Would my world-traveling be more so for my gain? Or more so to help others?
- How do I depict my world-traveling to others as to continue building the scholarship?
- How do I keep the helping of the marginalized at the forefront of the scholarship?

## REFERENCES

Agboka, G. (2013). Participatory localization: A social justice approach to navigating unenfranchised/disenfranchised cultural sites. *Technical Communication Quarterly*, *22*(1), 28–49. https://doi.org/10.1080/10572252.2013.730966

Atherton, R. (2021). "Missing/Unspecified": Demographic data visualization during the COVID-19 pandemic. *Journal of Business and Technical Communication*, *35*(1), 80–87. https://doi.org/10.1177/1050651920957982

Bacha, J. A. (2018). Mapping use, storytelling, and experience design: User-network tracking as a component of usability and sustainability. *Journal of Business and Technical Communication*, *32*(2), 198–228. https://doi.org/10.1177/1050651917746708

Colton, J. S., & Holmes, S. (2018). A social justice theory of active equality for technical communication. *Journal of Technical Writing and Communication*, *48*(1), 4–30. https://doi.org/10.1177/0047281616647803

Cui, W. (2019). Rhetorical listening pedagogy: Promoting communication across cultural and societal groups with video narrative. *Computers and Composition*, *54*, 102–517. https://doi.org/10.1016/j.compcom.2019.102517

Dragga, S., & Voss, D. (2001). Cruel pies: The inhumanity of technical illustrations. *Technical Communication*, *48*(3), 265–274.

Dragga, S., & Voss, D. (2003). Hiding humanity: Verbal and visual ethics in accident reports. *Proceedings/ STC, Society for Technical Communication Annual Conference*, *50*(1), 457–461.

Haraway, D. J. (1988). Situated knowledges: The science question in feminism of partial and the privilege. *Feminist Studies*, *14*(3), 575–599.

Jones, N. N. (2016). Narrative inquiry in human-centered design: Examining silence and voice to promote social justice in design scenarios. *Journal of Technical Writing and Communication*, *46*(4), 471–492. https://doi.org/10.1177/0047281616653489

Jones, N. N., & Walton, R. (2018). Using narratives to foster critical thinking about diversity and social justice. In *Key Theoretical Frameworks: Teaching Technical Communication in the Twenty-First Century* (pp. 241–260). Utah State University Press.

Kimball, M. (2006). London through rose-colored graphics: Visual rhetoric and information graphic design in Charles Booth's maps of London poverty. *Journal of Technical Writing and Communication*, *36*(4), 353–381. https://doi.org/10.2190/K561-40P2-5422-PTG2

Lugones, M. (2003). *Pilgrimages/Peregrinajes: Theorizing Coalition Against Multiple Oppressions*. Rowman & Littlefield Publishers.

Mays, R. E., Walton, R., & Savino, B. (2013). Emerging trends toward holistic disaster preparedness. *ISCRAM 2013 Conference Proceedings - 10th International Conference on Information Systems for Crisis Response and Management*, *May*, 764–769.

Mohanty, C. T. (2003). *Feminism without Borders*. Duke University Press.

Ortega, M. (2016). *In-Between: Latina Feminist Phenomenology, Multiplicity, and the Self*. State University of New York Press.

Petersen, E. J., & Walton, R. (2018). Bridging analysis and action: How feminist scholarship can inform the social justice turn. *Journal of Business and Technical Communication*, *32*(4), 416–446. https://doi.org/10.1177/1050651918780192

*Principles and Good Practice of Humanitarian Donorship*, (2003) (testimony of Principles and Good Practice of Humanitarian Donorship).

Propen, A. (2007). Visual communication and the map: How maps as visual objects convey meaning in specific contexts. *Technical Communication Quarterly*, *16*(2), 233–254. https://doi.org/10.1080/10572250709336561

Ramler, M. E. (2021). Queer usability. *Technical Communication Quarterly*, *30*(4), 345–358. https://doi.org/10.1080/10572252.2020.1831614

Ratcliffe, K. (2005). *Rhetorical Listening: Identification, Gender, Whiteness*. Southern Illinois Press.

Vats, A. (2014). Racechange is the new black: Racial accessorizing and racial tourism in high fashion as constraints on rhetorical agency. *Communication, Culture & Critique*, *7*(1), 112–135. https://doi.org/10.1111/cccr.12037

Walton, R., Mays, R. E., & Haselkorn, M. (2016). Enacting humanitarian culture: How technical communication facilitates successful humanitarian work. *Technical Communication*, *63*(2), 85–100.

Welhausen, C. A. (2015). Power and authority in disease maps: Visualizing medical cartography through yellow fever mapping. *Journal of Business and Technical Communication*, *29*(3), 257–283. https://doi.org/10.1177/1050651915573942

## ABOUT THE AUTHOR

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# Humanitarian Technical Communication in Praxis

## APPENDIX

List of Redesigns that could be created from World-Traveling to the Map of Migrant Mortality

- Men Drowning
- Men's Death by Gunshot
- Men's Motor Vehicle Accidents
- Women's Death by Pregnancy Complications
- Common Causes of Death throughout Different Land Corridors
- Common Causes of Death for Children
- Locations with the Highest Concentration of Skeletal Remains
- Comparative Map that Shows the Proximity Men and Women Die compared to Water Stations
- A Map that Shows the Causes of Death that Pertain to Certain Seasons of the Year
- A Map that Shows the Leading Causes of Death throughout Certain Decades
- A Map that Shows if Deaths have Lessened since the Implementation of Water Stations
- A Map that Shows the Relocation of Water Stations and the Lives-lost that Surrounds them

And many others.

### Suggested Reading on World-Traveling and Narrative Inquiry

Dewart, G., Kubota, H., Berendonk, C., Clandinin, J., & Caine, V. (2020). Lugones's metaphor of "world travelling" in narrative inquiry. *Qualitative Inquiry*, *26*(3–4), 369–378. https://doi.org/10.1177/1077800419838567

# Mapping the Evolutionary Characteristics of Global Research Related to Technical Communication: A Scientometric Review

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By Mingdan Luo, Dorothy DeWitt, and Norlidah Alias


## ABSTRACT

**Purpose:** Technical communication (TC) is an emerging topic which has received attention in both the field of language studies and among the technical profession in the last few decades. In this article, a scientometric review of academic publications to explore the intellectual landscape and evolutionary characteristics of TC research worldwide between 2001 and 2020 is conducted.

**Methods**: Visualization software was employed to analyze co-citation and co-word networks from 2,183 articles published in Web of Science and Scopus databases from 2001 to 2020.

**Results**: The findings indicate that TC research has increased in recent years and has been done in the English language departments and technology departments in recent years. Then, five clusters form the intellectual structure of TC research: *translation training, methodologies in TC, composition studies, rhetorical action, and the industry's needs.* Finally, the findings indicated there were paradigm shifts in the field of TC. Further, the evolution analysis has shown that the current trends of TC research is now focused on TC pedagogy, a global TC, human-computer interaction, and language learning and training.

**Conclusion**: This review provides reliable information for academics and practitioners to identify the knowledge base, the evolutionary process, and the emerging trends in the TC field from visualized maps. This review can serve as a prelude for future TC research and can provide a guide for the TC skills required among professionals in the future.


**KEYWORDS:** Alluvial diagram, CiteSpace software, co-citation analysis, co-word analysis, evolution characteristics, technical communication

## Practitioner's Takeaway

- This article presents the dynamic development, paradigm shifts, and research frontier of the TC field in an innovative and visualized manner, which can benefit a wide range of readers in various areas of TC.
- Practitioners would be more perceptive and productive in their practice and teaching once they recognize the changing roles and competencies in TC trends related to language, technological tools, and human-computer interaction.
- Curriculum designers need to consider the delivery of language skills through online courses as well as using technological tools in blended learning for the future.

# Mapping the Evolutionary Characteristics of Global Research

## INTRODUCTION

In the last decade, scholars have investigated definitions of technical communication (TC) and their related terms (Carradini, 2020) as well as the main issues in this area (Rude, 2009). Some of this research has also reviewed the research methods used in TC (Boettger & Lam, 2013; McNely, Spinuzzi, & Teston, 2015).

Other studies have focused on careers which require TC. For instance, Lanier (2009) found that employers required technical communicators with technical or domain-specific knowledge, while Brumberger and Lauer (2015) analyzed core competencies required for TC in the job market. Hence, the continued interest and research in TC has provided a critical need to review and update the current research base for references of academics and practitioners.

Although the preceding works of literature in TC are valuable and can provide a solid foundation for future research, there are limitations due to the limited breadth and scope of previous review (Chen, 2017). In addition, reviewing a large body of literature to identify viewpoints, connections, distinct features, or make conclusions, is both time and energy-consuming and is limited by one's cognitive ability (Aryadoust & Ang, 2019). To address this limitation and bridge this gap, a scientometric review can be conducted to provide a significant body of knowledge on topics that are important in the field. In this way, the review is not limited to the partial contributions of specific articles but will focus on the overall development of TC research. Moreover, providing a visualization of the data helps readers better comprehend the data.

A scientometric review is a method of quantitative analysis of literature used to understand the emerging themes and knowledge base in the field of research (Chen et al., 2012). There have been at least three scientometric review articles on TC. Smith's (2000) review of articles from 1988 to 1997 showed that there was increased interest and research in TC journals for a variety of disciplines. This important article also distinguished this method from other reviews by investigating the vast size of the datasets. In another study, Lowry et al. (2007) investigated the perceived quality of TC-related journal articles. The results showed that although high-impact articles were generally published in high-ranked journals, high-impact research was still published in lower-ranked journals (Lowry et al., 2007). Hence, researchers need to continuously explore topics by retrieving data from various reputable databases rather than being limited to specific journals. In the quantitative content analysis of academic publications from 1996 to 2017, several characteristics were identified, such as the content and resources for TC tended to be process-driven instead of product-driven, and topics related to communication strategy and collaboration might foster future academic-industry connection (Friess & Boettger, 2021). Hence, based on these findings, this review intends to examine TC-related articles in the last two decades (from 2001 to 2020) to determine trends.

Chen, Ibekwe-SanJuan, and Hou (2010) expanded the traditional co-citation analysis methodology with other visualization tools to include new functions, which facilitated analytical tasks and interpretation through automatic cluster labeling and summarization using the scientometric tool, CiteSpace. There has been an upward trend in the use of CiteSpace in various fields (Pan et al., 2018). It has been used to explore emerging trends in regenerative medicine (Chen et al., 2012); it has been used to obtain visualization in the agent-based computing research domain (Niazi & Hussain, 2011) and to identify the current state and trends in the field of public-private partnerships (PPP) research (Song, Zhang, & Dong, 2016); Morar and Agachi (2010) used CiteSpace to present a comprehensive review on the development of heat integration techniques; Fang, Yin, and Wu (2018) used it to map the evolution and emerging trends of climate change and tourism research through the co-citation network; and Jiang, Ritchie, and Benckendorff (2019) used CiteSpace to analyze the intellectual structure of the tourism crisis and disaster management.

Despite the popularity of CiteSpace, as of this writing, no attempt has been made to apply it to analyze the literature reviewed on TC. This article can provide reliable information for both academics and practitioners to quickly identify the knowledge base, the evolutionary process, and the emerging trends in the TC field to be shown as a visual map, which may serve as a prelude to future TC research and could contribute to the future of technical communication as a profession.

## METHODS

CiteSpace is used to code bibliographic records by citing articles and generating networks of co-cited references. The co-citation analysis of the document functions to identify the intellectual structures based on the accumulated co-citation trails in these references (Chen et al., 2012).

As mentioned, several structural and temporal metrics of co-citation networks were applied for clustering (Chen, 2017). Specifically, structural metrics consist of betweenness centrality, modularity, and silhouette, while temporal metrics include citation bursts. The betweenness centrality metric, which measures the importance of the position of the node in the network (the higher the value is, the more significant the reference is), is defined for each node in a network. Citation burst is to detect abrupt changes, such as exceptionally sharp increases among articles that share the same topic (Kleinberg, 2003). The sigma score of a node is a combined metric of both betweenness centrality and citation burst (Chen, 2017). Modular Q measures the degree to which the network can be divided into independent blocks. A high modularity suggests a well-structured network (Chen et al., 2010). In other words, the closer its value is to 1.00, the clearer the boundaries with other clusters are. The silhouette value is used to measure the homogeneity of each cluster. A silhouette value which is very close to the highest value of 1.00 means that the cluster can be regarded as an identified specialty with high validity in the field (Chen, 2017).

In addition, the clustering function of CiteSpace adopts the theory of spectral clustering (Chen et al., 2010), which has been proven as an efficient and generic clustering method (von Luxburg, 2007). The cluster labels displayed are selected from the terms with the highest weights among the citations of the articles in each cluster.

Time is not easy to display clearly in networks, so we used the alluvial diagram to present these complex networks and their relations. By transforming the static network to a dynamic alluvial diagram, the changing path of emerging and significant topics can be tracked. The alluvial generator was utilized to present the visualized network created by CiteSpace. The alluvial diagram was applied to demonstrate the temporal changes in a network's composition, for example, changes in the structures of scientific disciplines or changes in the usage of words over time (Yeung, 2018).

This review, using these visualization tools, aims to explore the intellectual landscape and evolutionary characteristics related to TC research worldwide and across different fields. The current study aims to answer the following research questions:

1. What constitutes the intellectual structure of TC research from 2001 to 2020?
2. What are the evolutionary characteristics of TC research over the past two decades?

### Data collection procedure

The Web of Science and Scopus databases are regarded as the most reliable data sources because both these large databases allow researchers to export detailed bibliographic information (comprising of author, title, abstract, keywords, and cited reference). Further, these databases provide an ideal data source and a friendly format for scientometric reviews (Fang, Yin, & Wu, 2018; Jing et al., 2020).

A total of 3,316 English published articles, including review articles, were retrieved from the two databases from 2001 to 2020 on 26 December 2020, when applying a topic search using the terms "technical communication," "technical writing," "technical English," and "technical and professional communication." After removing duplicates, there were a total of 2,183 qualified records from Web of Science (941) and Scopus (1,242). See Figure 1 for the trend in number of publications from 2001 to 2020.

# Mapping the Evolutionary Characteristics of Global Research

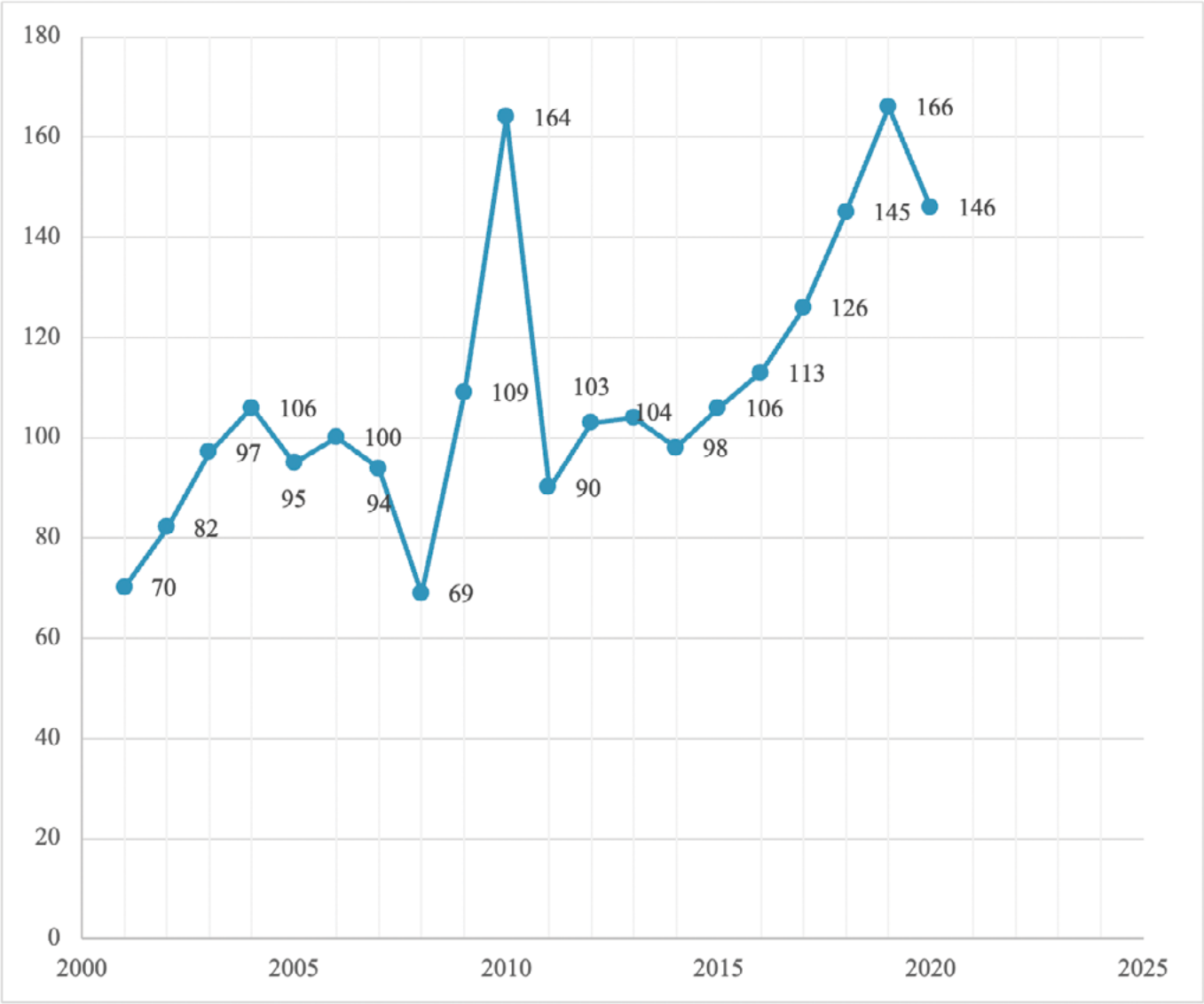


**Figure 1. Trends in the total number of publications from 2001 to 2020**

## Data analysis

The data collected was then analyzed using a scientometric review by applying two bibliometric techniques: document co-citation analysis and co-word analysis.

## Co-citation analysis

Co-citation analysis, which studies the relationship between two co-cited papers, has been used to analyze the intellectual structure of scientific areas (Liu & Chen, 2012). Compared with citation-only analysis, co-citation analysis provides more reliable and insightful information of knowledge domains (Mustafee, Katsaliaki, & Fishwick, 2014).

CiteSpace has been used to convert and code the data from the title, author, keywords, abstract, institution, country, reference, and other detailed information, which is next analyzed and visualized. Then, with CiteSpace, co-citation networks of these data are formed and presented as clusters. In each cluster, the literature was classified by the structure and time indicators of research influence. The features of a cluster were identified from these aspects and include the prominent authors and the development

of their milestone masterpieces, appearing as topics in the citation of articles, which show interconnections between the current intellectual focus and the research frontiers (Chen, 2017). Specifically, the five steps in the process of co-citation analysis are: 1) export the bibliographic record of cited articles from the databases; 2) code the data and construct a matrix of co-cited references using CiteSpace; 3) display the co-citation matrix in a node-and-link diagram; 4) use a variety of algorithms for clustering; and 5) interpret the characteristics of co-citation clusters.

### Co-word analysis

Co-word analysis is a bibliometric technique that tracks the connections between concepts that co-occur in titles, abstracts, or keywords (Bernatović et al., 2021). Among the bibliometric methods, co-word analysis is the only method that uses the actual content of the documents to construct a similarity measure (Zupic & Čater, 2015).

The output of the co-word analysis is a network composed of topics and their relationships, which represent the conceptual space of a domain (Zupic & Čater, 2015). The networks were presented as a diagram that can be better understood as the emerging topics in the TC field. These emerging topics were identified depending on the word profiles derived from citing articles based on the weights of the noun terms used. Highly cited articles have higher frequencies of these noun terms and a greater weight value. The steps for this analysis are as follows: 1) divide data into periods as .net files and generate co-word networks in CiteSpace; 2) import the networks into an alluvial diagram generator; 3) use the filter function to simplify the diagram; and 4) interpret the changes over time.

However, there are several limitations in this study. First, only references from the Web of Science and Scopus databases are compiled. While these are the two most influential bibliographic databases globally, yet the scope of the publications may be limited. Second, the current study only selected the term "technical communication," "technical writing," "technical English," and "technical and professional communication" for the search. These four distinct terms were used for the search criteria to ensure the research scope was broad enough to cover all related studies as well as to ensure reliability of the research. However, there might have been terms or keywords which were not taken into consideration and might have resulted in some references being excluded. On the other hand, the study's findings mitigate this limitation as the results showed that the similarities among these terms (technical communication, business communication, professional communication, technical and professional communication) are strong enough and share some topical overlap in research articles (Carradini, 2020). Third, the current study only includes articles written in English. Both the Web of Science and Scopus databases include far fewer non-English journals, and this limited sample could be unrepresentative of the non-English studies. Nevertheless, future research could include articles published in other languages.

## RESULTS AND DISCUSSION

### The Intellectual Landscape of Technical Communication Research

In the analysis for research institutions, the most identified research institutions were American public research universities and included reputable universities, such as Arizona State University, Utah State University, Texas Tech University, University of North Texas, and the University of South Florida (Figure 2). Moreover, it was found that the researchers involved were not only from the English department but included the computer science, chemistry, and engineering departments. References with significant and notable tree-rings in red are high-impact contributions, highly cited, and have strong citation bursts (Chen, 2017). Therefore, it can be concluded from Figure 2 that TC research has been actively done in the English language departments and technical departments in recent years.

# Mapping the Evolutionary Characteristics of Global Research


**Figure 2. Research institutions in this field**

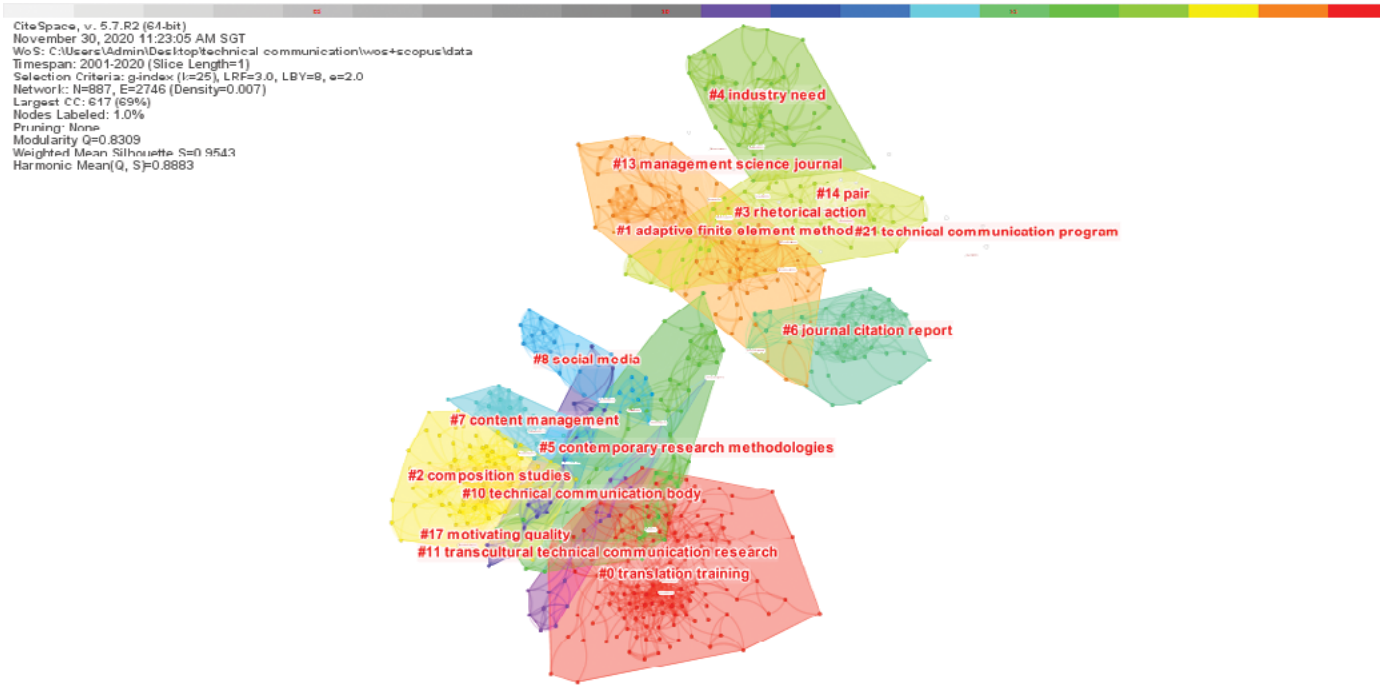


**Figure 3. A visualization of the co-citation network. There are 887 nodes in the network of co-cited articles on TC (2001–2020). Each cluster is automatically labeled by the keyword within it and by the highest value and marked in different colors. Later clusters are superimposed on earlier clusters. For example, the green cluster was generated after the yellow cluster and so forth. The red cluster is the latest one.**

The map of the results of the co-citation cluster analysis indicates the intellectual base of the underlying specialty of TC. The five most significant clusters were identified as *translation training, methodologies in TC, composition studies, rhetorical action, and industry's need* (Figure 3).

From the outcomes, the silhouette values of the five most significant clusters were over 0.85, which demonstrated their reliability. The quantitative calculation of the significance of the clusters provides a valuable contribution, but qualitative content analysis methods will need to be used to supplement and identify the central themes and intellectual structure. For this purpose, the qualitative content analysis is a summative content analysis which compares and contrasts the keywords or content, followed by the interpretation of the context (Hsieh & Shannon, 2005).

Further, the references with high-frequency co-citations in the five most significant clusters are summarized automatically and exported in Table 1.

The metrics and indicators of the research impact were taken into consideration as the citation counts, the h-index and its numerous extensions, and a rich set of altmetrics on social media were included (Chen, 2017). The following terms emerged as the most significant and influential cluster from these metrics: (a) translation training, (b) social justice, (c) transformative paradigm.

First, for TC translation, the current professional translation industry is concerned with the issues of sundry professional translation-related services and practices (Martín, 2020). To some extent, translation training is a value-added service for both industry and graduates' employability, and we can infer that those professionals need to be equipped with TC skills for a solid support in their careers.

Second, social justice refers to issues related to social justice and ethics in the TC field. Social justice is the bridge from diversity to inclusion (Jones, Moore, & Walton, 2016). Initially, Williams and Pimentel (2012) addressed the significance of race, ethnicity, and multiculturalism in TC. Since then, scholars in the TC field have been exploring strategies for developing more inclusive methods. These methods significantly contributed to the TC field to collectively advocate for social justice as a central goal for a more inclusive research and pedagogy (Jones et al., 2016). Walton and Jones (2013) predicted that in the following five to ten years, one of the most critical research questions in the field of TC is how to navigate increasingly cross-cultural, cross-disciplinary, and cross-organizational contexts to support social justice through better communication because identity factors that touch upon race, class, gender, and sexuality are not mutually exclusive. Agboka (2014) noted that many research methods applied in the intercultural TC field were limited in responding to emerging social justice challenges, so he suggested decolonializing approaches as an alternative by highlighting how these approaches are used in intercultural research. The study

**Table 1. The five most significant clusters in the TC research field**

| Cluster ID | Size | Silhouette | Label | Top Terms (LLR) |
|---|---|---|---|---|
| 0 | 138 | 0.97 | translation training | translation training; social justice; transformative paradigm; equipping technical communication researcher |
| 1 | 86 | 0.961 | methodologies in TC | historical look; research scope; sociocultural field methodology; guest editors introduction |
| 2 | 81 | 0.88 | composition studies | composition studies; working professional; multilingual writing processes; building transdisciplinary connection; business communication; workplace-situated graduate student research; fostering industry connection; |
| 3 | 55 | 0.952 | rhetorical action | rhetorical action; critical practice; information architecture; practitioner research instruction; curricular area |
| 4 | 45 | 0.942 | industry need | industry need; connecting usability education; technical communication theory; career perspective; curriculum design |

of social justice also includes TC pedagogy, such as in preparing students to advocate for marginalized and under-resourced people in contexts from their local communities to employment organizations (Walton & Jones, 2013). Haas (2012) provided a case study of curriculum development for graduates, which support disciplinary inquiry at the intersection of race, rhetoric, technology, and TC. Some other studies include empirical research, such as a case study of engineering students and literature, culture, and digital media students participating in cross-disciplinary, cross-cultural distributed work teams (Paretti, McNair, & Holloway-Attaway, 2007) and cross-culture technology design for local users (Sun, 2012).

Interestingly, this cluster also includes references concerning the medical setting. Patients are seen as participants (those using technical writing outside professional situations) in co-construction and co-design of health care texts (Bellwoar, 2012). This situated study of local TC practices can be reproduced to expand the breadth of existing research. Thus, we begin to reimagine the broader scope of TC to include an approach to literacies in other fields, to a range of sites, to genres, and to texts that undo the privileging of patriarchal institutional spaces (Bellwoar, 2012).

In cluster 1, the summary report showed that the most active citer in the cluster is Mackerle's (2001) *Error estimates and adaptive finite element methods: A bibliography (1990-2000)*, we labeled it as *methodologies in TC* through content analysis. Mackerle (2001) proposed a new method to help professionals in engineering obtain information and communicate the results of research. In addition, Carliner (2012), Baehr (2015), Brumberger and Lauer (2015), and Boettger and Lam (2013) were identified as authors of high-impact publications. The sigma scores of these articles are relatively high because of their high structural centrality and intense citation burst. Carliner (2012) addressed that methods to professionalization were rooted in occupation theories, which mention standard components of infrastructure for occupations, such as professional organizations, bodies of knowledge, education, professional activities, and certification. Carliner (2012) proposed three approaches to professionalize TC: formal branding of the profession, the establishment of certification, and support for professional organizations. Baehr (2015) provided a snapshot of how industry leaders conceptualize technical communicators' identities and relationships through a modified Delphi method. The findings showed that technical communicators function as agile, adaptable, and multi-specialists in a broad range of organizational functions. Brumberger and Lauer (2015) simultaneously analyzed information products, technologies, professional competencies, and personal characteristics requested by the industry. Boettger and Lam (2013) conducted a quantitative and qualitative analysis of papers published within five leading journals on TC from 1992 to 2011. The results showed that solid correlation variables, such as pedagogy, virtual collaboration, and intercultural communication were found. This review also investigated the original field that the researchers cited in their papers, which are business and TC and the STEM programs, communication studies, human-computer interaction, education, and linguistics and language behavior, writing studies, business and economics, information and knowledge management, gender studies, and medicine. Some scholars reviewed the research methodologies in TC, and they found that many tools, technologies, spaces, and practices of TC today dramatically changed (McNely, Spinuzzi, & Teston, 2015). McNely et al. believed that action research, participatory design, and visual methods have adapted and extended traditional qualitative approaches for nuances of contemporary TC. Therefore, it is necessary to review the relevant research on TC in the past 20 years to explore the evolutionary characteristics and future trends of the TC research field worldwide.

The following terms established composition studies as the third cluster: working professional; multilingual writing processes; building transdisciplinary connection; business communication. Studies in this cluster analyzed the form and content of TC. Some studies investigated the required TC-related competence in the industry. They all mentioned technical writing skills during multilingual writing processes as the basis of technical communicators (Brumberger & Lauer, 2015; Lanier, 2009). Further, more and more research discussed the standardization of TC, and technical communicators are required to meet the defined standards for authoring and managing content. Content management refers to topic-based information design and mainly refers to the technologies and processes that support the creation of highly adaptable and portable structured content (Andersen, 2014). Andersen (2014)

also addressed the need for a praxis-based collaborative model for technical communication pedagogy and academic research and proposed that the best practice is rhetorical work from the content management perspective. A recent quantitative content analysis on TC journals found that the themes mainly focused on four categories: rhetoric, genre, pedagogy, and diversity (Boettger & Friess, 2020).

The references in cluster 3 have been active for 13 years (from 1995 to 2007) and less active since 2013. This cluster is dominated by significant terms, such as technical writing and curriculum development. In Figure 4, several outstanding references were displayed with the red outer ring. By reviewing these articles, we found that the research at the end of the last century focused on developing technical writing skills through pedagogical programs. Firstly, according to cultural theory, several studies support this notion, including Longo (1998), who suggested how technical writing was constituted as an object of study. Secondly, Longo (2000) addressed TC as a channel for scientific information and argued that the studies before fell short of considering the broader and more complex contexts. Longo's (2000) work noted that some in the field of liberal arts have participated in causing disciplinary inequity by empowering scientists and engineers to privilege their form of knowledge over liberal arts expertise.

Moreover, Mirel and Spilka (2002) addressed that many TC practitioners found the current academic studies were irrelevant to their needs: The practices outlined in academic publications did not tally with the practitioners who have 11 years of industry experience. Another challenge was that technical communicators feel a lack of status, often marginalized within departments. One problem is a lack of understanding about the field among university administrators and colleagues. The other is that TC practitioners feel undervalued within their organizations because they face corporate layoffs sooner than product designers and engineers, whose contributions are perceived as a core position in companies. In addition, Allen and Benninghoff (2004) reported results from a survey of TC undergraduate programs concerning core concepts

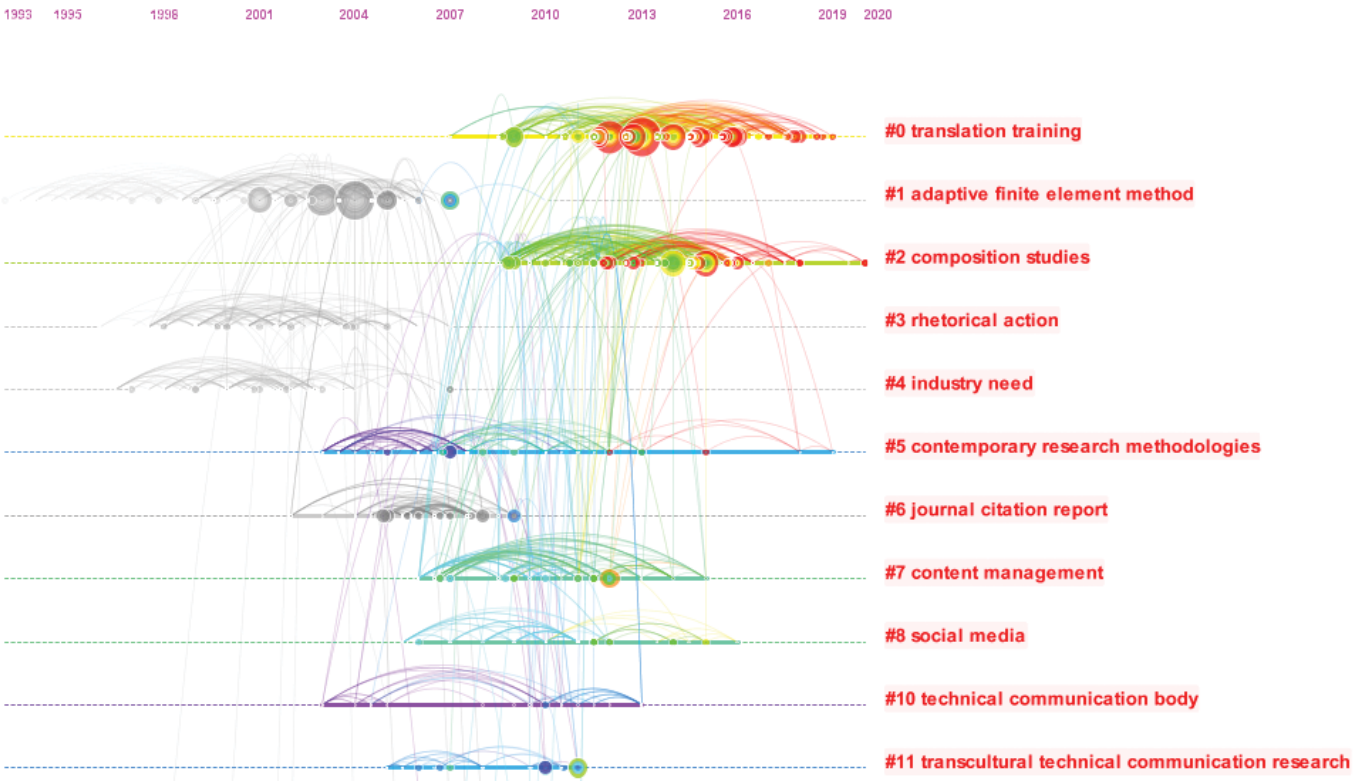


**Figure 4. A timeline view of co-citation network. The large and notable tree-rings in red color represent well-marked high-impact contributions. The active duration of each cluster is colored and bolded.**

emphasized and most commonly taught procedures, skills, and tools in the United States. Giammona (2004) also concludes that the themes of the TC programs in the future are about innovation, global concerns, managing technical leaders and practitioners, and the impact of new technologies.

Cluster 4 labeled as *industry need* contained these significant terms: industry needs; connecting usability education; technical communication theory; career perspective; career theory; curriculum design. It has been less active since 2007 (Figure 4). However, some high-impact references were still identified from the timeline view. The contributions consistently focus on two topics in this field, which are highly consistent with the terms. First, some studies focused on the industry needs. For example, Schriver (1997) described creating a document based on the readers' needs. Bazerman and Lander (2001) emphasized that rhetoric can occupy a "clearing" that is obscured in these other approaches to science studies.

Moreover, Spilka (2009) also discussed digital literacy for TC in the 21st century from the perspective of the TC industry. Redish's (2007) book elaborated on how to design web content. A more recent study from the perspective of the TC industry focuses on the core competencies of technical communicators by analyzing the wide range of information products, technologies, professional competencies, and personal qualities required by an industry job posting (Brumberger & Lauer, 2015).

Another emerging issue under discussion is on connecting the academic and profession. Dias, Freedman, Medway, and Paré (1999) illustrated how writing functions within the activities of various disciplines, based on a seven-year comparative study of writing in different university courses and matched workplaces. They also elaborated further understanding of the relationships between writing in academic and workplace settings. Davis (2001) addressed the role of both academic programs and professional societies in shaping the profession's future. Wilson and Ford (2003) investigated seven professionals on their experiences entering the TC field and provided helpful information regarding how academic preparation does not prepare students for workplace realities. Cooke and Mings (2005) investigated the knowledge, skills, and abilities that TC trainers needed to emphasize in teaching usability and how academic research in usability can benefit practitioners. For career theory in this cluster, Hart-Davidson (2001) studied the core competencies of TC and highlighted that theory was needed because the practitioners and scholars in TC should work together to make the core expertise of TC explicit.

Furthermore, the clusters can reflect paradigm shifts. Namely, a new paradigm replaces the existing paradigm and provides an overall framework for the research field (Chen, 2017). Hence, this can explain how the less active clusters were replaced by new emerging clusters. Together, from the timeline view and high-impact references, we found that the research focus shifted from cluster 4 (*industry need*) to cluster 1 (*methodologies in TC*), while cluster 3 (*rhetorical action*) shifted to cluster 0 (*translation training*) and cluster 2 (*composition studies*).

Conclusively, based on the above discussions, it is evident that the rapid expansion of TC to various fields is reshaping the TC academic and practical areas. In order to find more evidence of the evolutionary characteristics of TC research, we presented an alluvial diagram of TC research over the past 20 years.

## Evolutionary Characteristics of Technical Communication Research from 2001 to 2020

For evolution analysis, as mentioned, the diagram was used to show the changes between time points. An alluvial diagram was generated to identify the evolutionary features of TC research over the past 20 years. An alluvial diagram with clusters ordered by size shows changes in network structures over time (Rosvall & Bergstrom, 2010). Following all streams from one cluster to another makes it possible to study the mergers with other clusters and the focus transitions in detail. In other words, curvilinear flows are suddenly interrupted in some clusters, which do not indicate the topic's termination but transform into a new research topic. For instance, as seen in Figure 5, the *Teaching* cluster in first phase (2001–2005) was divided into *methodology, engineering communication*, and *empirical analysis* clusters in phase two (2006–2010). Moreover, the height of a stream represents the value of weight of a key word in one cluster (Ruan, Hou, & Hu, 2017). To simplify the figure and make it readable, the thin streams with less significant key words were filtered out. For example, in Figure 5, there are streams connecting the *culture* cluster in phase two (2006–2010) with succeeding clusters in phase three (2011–2015), but

there is no keyword with high value. Hence, these thin streams were filtered when simplifying the diagram.

In the visualization of the alluvial diagram, a cluster is displayed as a block in a specific column. The citation flow of specific research is then determined based on the height of the corresponding block. Streamlines connect modules that contain the same nodes. The two connected nodes represent co-word articles, which means the same noun term co-occur in titles, abstracts, or keywords of two articles. The height of the streamline is proportional to the aggregated flow in the nodes present in the connected modules. For example, the *rhetoric* cluster in phase one (2001–2005) shares overlapping keywords with the *methodology* cluster in phase two (2006–2010).

Figure 5 shows various clusters during the four time phases. Analyzing data year by year would be tedious, so we defined the time slice as five years. However, the limitation here is that important details in each year are missed.

In the first phase (2001–2005), some significant clusters can be identified, such as *rhetoric, teaching, scientific communication, usability, application software,* and *writing skills.* The cluster is labeled by the keyword within it with the highest value (Ruan, Hou, & Hu, 2017).

As TC research proceeded to the second phase (2006–2010), five influential clusters emerged—*methodology, engineering communication, empirical analysis, culture,* and *creativity.* Dating back to 2009, there was some significant breakthrough of connection of industry and academia by conducting interdisciplinary research and empirical research (Lanier, 2009; Rude, 2009). This trend had boosted TC's growth, including TC pedagogy, technology, and methodology.

In the third phase (2011–2015), some significant clusters emerged, labeled *business, content management, engineering research, medical education,* and *learning system.* During 2011–2015, both working situation and pedagogical system are prominent themes. Moreover, IR 4.0 promoted the advancement of many fields. Zhang (2017) even mentioned a significant challenge to adapt to inter-disciplinary and cross-disciplinary

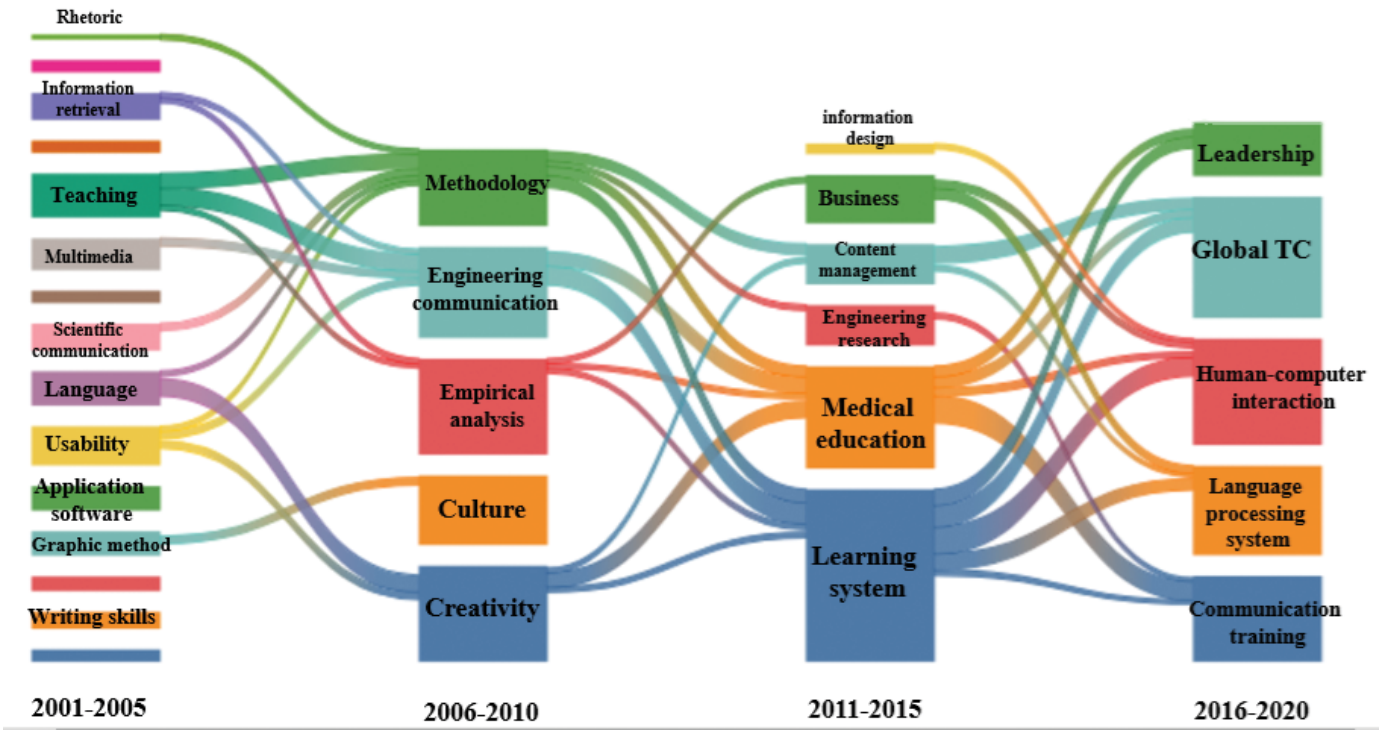


**Figure 5. The alluvial diagram shows how clusters change between different networks over time. The networks are presented as vertical stacks connected by streamlines. In each stack, nodes that are clustered together form a module, shown as a rectangle. Streamlines connect modules that include the same nodes. The height of the streamline is proportional to the aggregated flow in the nodes that are present in the connected modules.**

work requirements in the IR 4.0 era. To this end, TC is infiltrating applied disciplines, such as engineering and medical education. This finding is consistent with the result of the previous co-citation analysis. Specifically, we identified Bellwoar's (2012) article in the medical context with high impact, supporting medical education became an important topic during this period.

In the fourth phase (2016–2020), previously identified pedagogy-related clusters had finally merged into the clusters labeled *leadership, global TC, human-computer interaction, language processing system,* and *communication training.* So far, regarding the increasing influence of globalization, TC has dramatically transformed the educational system in leadership, language processing system, and communication training. In addition, technology in TC, particularly human-computer interaction, is also the research frontier in this field. Finally, language learning and communication training are continuous emerging research trends in the following years. More interestingly, this finding is also consistent with the previous result of co-citation analysis because we investigated that cluster 0 (*translation training)* and cluster 2 (*composition studies*) are relatively active now.

## CONCLUSION

In this study, a scientometric review was conducted, and the visualized bibliometric analysis was used to explore the development of TC research over the past two decades. We have offered reliable information so that technical communicators can quickly understand the intellectual landscape, evolutionary process, and research frontiers in the TC field via visualized maps, which may contribute to their future profession concerns. The results of co-citation analysis have revealed the intellectual landscape of TC research. First, TC research has been mainly active in the English language departments and technical departments in recent years. Second, we identified five main clusters as the intellectual structure of TC research, including *translation training, methodologies in TC, composition studies, rhetorical action,* and *industry's need*. Third, the findings indicated paradigm shifts. From the timeline view and high-impact references, we found that the research focus shifted from cluster 4 (*industry need*) to cluster 1 (*methodologies in TC*), while cluster 3 (*rhetorical action*) shifted to cluster 0 (*translation training*) and cluster 2 (*composition studies*). It is evident that the rapid expansion of TC to various fields reshapes TC academic and practical areas. Together, the findings of evolution analysis have shown that the emerging trends of TC research are TC pedagogy, global TC, human-computer interaction, language learning and communication training. Therefore, future research interest will likely focus on language learning, online class, and technological tools.

While verifying the findings of previous qualitative studies, this study has made progress in the breadth and depth of previous reviews involving computer-assisted software to identify the intellectual structure of the TC field and track its evolutionary process. More importantly, the current study presented the dynamic development and paradigm shifts as well as the research frontier of the TC field in an innovative and visualized manner, which could benefit the wide range of readers in various fields related to TC. For example, technical communicators can use this research to supplement their work as the main themes and evolutionary process can be obtained from visualized figures instead of trying to sort through an overwhelming mass of journal articles.

This research project can help TCs recognize both where the field has been and where it is going, where it is relatively stable and where it is changing. In doing so, it can help TCs make more perceptive and productive efforts in their practice and teaching. For example, practitioners would recognize the roles and competencies in the TC trends related to language, technological tools, and human-computer interaction. Meanwhile, for curriculum designers, the delivery of language skills through online courses as well as using technological tools in blended learning could be taken into consideration.

Although the results of this study extend past bibliometric studies of TC, there were some limitations. Hence, in order for a more comprehensive and equitable approach, future research should address the following: 1) include articles from other languages besides English for a more international perspective; 2) collect data from more databases for a more inclusive view; 3) expand the review to include TC-related books, newspapers, and theses which may have significant outputs; and 4) include more relevant terms and keywords, such as business and technical

communication so that the future emerging trends in the field are also captured.

## REFERENCES

Agboka, G. (2014). Decolonial methodologies: Social justice perspectives in intercultural technical communication research. *Journal of Technical Writing and Communication, 44*(3), 297–327. doi: 10.2190/TW.44.3.e

Allen, N., & Benninghoff, S. T. (2004). TPC program snapshots: Developing curricula and addressing challenges. *Technical Communication Quarterly, 13*(2), 157–185. doi: 10.1207/s15427625tcq1302_3

Andersen, R. (2014). Rhetorical work in the age of content management: Implications for the field of technical communication. *Journal of Business and Technical Communication, 28*(2), 115–157. doi: 10.1177/1050651913513904

Aryadoust, V., & Ang, B. H. (2019). Exploring the frontiers of eye tracking research in language studies: A novel co-citation scientometric review. *Computer Assisted Language Learning*, 1–36.

Baehr, C. (2015). Complexities in hybridization: Professional identities and relationships in technical communication. *Technical Communication, 62*(2), 104–117.

Bazerman, C., & Lander, D. (2001). The languages of Edison's light. *Canadian Journal of Communication, 26*(2/3), 295.

Bellwoar, H. (2012). Everyday matters: Reception and use as productive design of health-related texts. *Technical Communication Quarterly, 21*(4), 325–345.

Bernatović, I., Slavec Gomezel, A., & Černe, M. (2021). Mapping the knowledge-hiding field and its future prospects: A bibliometric co-citation, co-word, and coupling analysis. *Knowledge Management Research & Practice*, 1–16. doi: 10.1080/14778238.2021.1945963

Boettger, R. K., & Friess, E. (2020). Content and authorship patterns in technical communication journals (1996-2017): A quantitative content analysis. *Technical Communication, 67*(3), 5–25.

Boettger, R. K., & Lam, C. (2013). An overview of experimental and quasi-experimental research in technical communication journals (1992–2011). *IEEE Transactions on Professional Communication, 56*(4), 272–293. doi: 10.1109/tpc.2013.2287570

Brumberger, E., & Lauer, C. (2015). The evolution of technical communication: An analysis of industry job postings. *Technical Communication, 62*(4), 224–243.

Carliner, S. (2012). The three approaches to professionalization in technical communication. *Technical Communication, 59*(1), 49–65.

Carradini, S. (2020). A comparison of research topics associated with technical communication, business communication, and professional communication, 1963–2017. *IEEE Transactions on Professional Communication, 63*(2), 118–138. doi: 10.1109/TPC.2020.2988757

Chen, C. (2017). Science mapping: A systematic review of the literature. *Journal of Data and Information Science, 2*(2), 1–40.

Chen, C., Ibekwe-SanJuan, F., & Hou, J. (2010). The structure and dynamics of cocitation clusters: A multiple-perspective cocitation analysis. *Journal of the American Society for information Science and Technology, 61*(7), 1386–1409. doi: https://doi.org/10.1002/asi.21309

Chen, C. M., Hu, Z. G., Liu, S. B., & Tseng, H. (2012). Emerging trends in regenerative medicine: A scientometric analysis in CiteSpace. *Expert Opinion on Biological Therapy, 12*(5), 593–608. doi: 10.1517/14712598.2012.674507

Cooke, L., & Mings, S. (2005). Connecting usability education and research with industry needs and practices. *IEEE Transactions on Professional Communication, 48*(3), 296–312. doi: 10.1109/tpc.2005.853938

Davis, M. T. (2001). Shaping the future of our profession. *Technical Communication, 48*(2), 139–144.

Dias, P., Freedman, A., Medway, P., & Paré, A. (1999). *Worlds apart: Acting and writing in academic and workplace contexts*. Mahway, NJ: Lawrence Erlbaum.

Fang, Y., Yin, J., & Wu, B. (2018). Climate change and tourism: A scientometric analysis using CiteSpace. *Journal of Sustainable Tourism, 26*(1), 108–126.

Friess, E., & Boettger, R. K. (2021). Identifying commonalities and divergences between technical communication scholarly and trade publications (1996–2017). *Journal of Business and*

*Technical Communication, 35*(4), 407–432. doi: 10.1177/10506519211021468

Haas, A. M. (2012). Race, rhetoric, and technology: A case study of decolonial technical communication theory, methodology, and pedagogy. *Journal of Business and Technical Communication, 26*(3), 277–310. doi: 10.1177/1050651912439539

Hart-Davidson, W. (2001). On writing, technical communication, and information technology: The core competencies of technical communication. *Technical Communication, 48*(2), 145–155.

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277–1288. doi: 10.1177/1049732305276687

Jiang, Y. W., Ritchie, B. W., & Benckendorff, P. (2019). Bibliometric visualisation: An application in tourism crisis and disaster management research. *Current Issues in Tourism, 22*(16), 1925–1957. doi: 10.1080/13683500.2017.1408574

Jing, X., Ghosh, R., Sun, Z., & Liu, Q. (2020). Mapping global research related to international students: A scientometric review. *Higher Education*, 1–19.

Jones, N. N., Moore, K. R., & Walton, R. (2016). Disrupting the past to disrupt the future: An antenarrative of technical communication. *Technical Communication Quarterly, 25*(4), 211–229. doi: 10.1080/10572252.2016.1224655

Kleinberg, J. (2003). Bursty and hierarchical structure in streams. *Data Mining and Knowledge Discovery, 7*(4), 373–397. doi: 10.1023/A:1024940629314

Lanier, C. R. (2009). Analysis of the skills called for by technical communication employers in recruitment postings. *Technical Communication, 56*(1), 51–61.

Liu, S. B., & Chen, C. M. (2012). The proximity of co-citation. *Scientometrics, 91*(2), 495–511. doi: 10.1007/s11192-011-0575-7

Longo, B. (1998). An approach for applying cultural study theory to technical writing research. *Technical Communication Quarterly, 7*(1), 53–73.

Longo, B. (2000). *Spurious coin: A history of science, management, and technical writing*: SUNY Press.

Lowry, P. B., Humpherys, S. L., Malwitz, J., & Nix, J. (2007). A scientometric study of the perceived quality of business and technical communication journals. *IEEE Transactions on Professional Communication, 50*(4), 352–378. doi: 10.1109/tpc.2007.908733

Mackerle, J. (2001). Error estimates and adaptive finite element methods: A bibliography (1990-2000). *Engineering Computations, 18*(5-6), 802–914. doi: 10.1108/eum0000000005788

Martín, M. M. (2020). Transcreation as a way to promote employability in translation training: adding value to translation training. *Journal of Language and Communication in Business, 60*, 125–139.

McNely, B., Spinuzzi, C., & Teston, C. (2015). Contemporary research methodologies in technical communication. *Technical Communication Quarterly, 24*(1), 1–13. doi: 10.1080/10572252.2015.975958

Mirel, B., & Spilka, R. (2002). *Reshaping technical communication: New directions and challenges for the 21st century*: Routledge.

Morar, M., & Agachi, P. S. (2010). Review: Important contributions in development and improvement of the heat integration techniques. *Computers & Chemical Engineering, 34*(8), 1171–1179. doi: 10.1016/j.compchemeng.2010.02.038

Mustafee, N., Katsaliaki, K., & Fishwick, P. (2014). Exploring the modelling and simulation knowledge base through journal co-citation analysis. *Scientometrics, 98*(3), 2145–2159. doi: 10.1007/s11192-013-1136-z

Niazi, M., & Hussain, A. (2011). Agent-based computing from multi-agent systems to agent-based models: A visual survey. *Scientometrics, 89*(2), 479–499. doi: 10.1007/s11192-011-0468-9

Pan, X. L., Yan, E. J., Cui, M., & Hua, W. N. (2018). Examining the usage, citation, and diffusion patterns of bibliometric mapping software: A comparative study of three tools. *Journal of Informetrics, 12*(2), 481–493. doi: 10.1016/j.joi.2018.03.005

Paretti, M. C., McNair, L. D., & Holloway-Attaway, L. (2007). Teaching technical communication in an era of distributed work: A case study of collaboration between US and Swedish students. *Technical Communication Quarterly, 16*(3), 327–352.

Redish, J. G. (2007). *Letting go of the words: Writing web content that works*. Morgan Kaufmann.

Rosvall, M., & Bergstrom, C. T. (2010). Mapping change in large networks. *Plos One, 5*(1). doi: 10.1371/journal.pone.0008694

Ruan, W., Hou, H., & Hu, Z. (2017). Detecting dynamics of hot topics with alluvial diagrams: A timeline visualization. *Journal of Data and Information Science, 2*(3), 37.

Rude, C. D. (2009). Mapping the research questions in technical communication. *Journal of Business and Technical Communication, 23*(2), 174–215. doi: 10.1177/1050651908329562

Schriver, K. A. (1997). *Dynamics in document design: Creating text for readers*. John Wiley & Sons, Inc.

Smith, E. O. (2000). Strength in the technical communication journals and diversity in the serials cited. *Journal of Business and Technical Communication, 14*(2), 131–184. doi: 10.1177/105065190001400201

Song, J. B., Zhang, H. L., & Dong, W. L. (2016). A review of emerging trends in global PPP research: analysis and visualization. *Scientometrics, 107*(3), 1111–1147. doi: 10.1007/s11192-016-1918-1

Spilka, R. (2009). *Digital literacy for technical communication: 21st century theory and practice*. Routledge.

Sun, H. (2012). *Cross-cultural technology design: Creating culture-sensitive technology for local users*: OUP USA.

von Luxburg, U. (2007). A tutorial on spectral clustering. *Statistics and Computing, 17*(4), 395–416. doi: 10.1007/s11222-007-9033-z

Walton, R., & Jones, N. N. (2013). Navigating increasingly cross-cultural, cross-disciplinary, and cross-organizational contexts to support social justice. *Communication Design Quarterly Review, 1*(4), 31–35.

Williams, M. F., & Pimentel, O. (2012). Introduction: Race, ethnicity, and technical communication. *Journal of Business and Technical Communication, 26*(3), 271–276. doi: 10.1177/1050651912439535

Wilson, G., & Ford, J. D. (2003). The big chill: Seven technical communicators talk ten years after their master's program. *Technical Communication, 50*(2), 145–159.

Yeung, A. W. K. (2018). Data visualization by alluvial diagrams for bibliometric reports, systematic reviews and meta-analyses. *Current Science, 115*(10), 1942–1947. doi: 10.18520/cs/v115/i10/1942-1947

Zhang, H.-L. (2017). 4.0 [Research on the change of professional ability demand structure and the adjustment strategy of vocational education in the industrial 4.0 age]. *Modern Education Management,* (10), 108–112.

Zupic, I., & Čater, T. (2015). Bibliometric methods in management and organization. *Organizational Research Methods, 18*(3), 429–472. doi: 10.1177/1094428114562629

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Jackie Damrau, Editor

# Books Reviewed in This Issue

*The reviews provided here are those that are self-selected by the reviewers from a provided list of available titles over a specific date range. Want to become a book reviewer? Contact Dr. Jackie Damrau at jdamrau3@gmail.com for more information.*

## design and digital interfaces: Designing with aesthetic and ethical awareness

Ben Stopher, John Fass, Eva Verhoeven, and Tobias Revell. 2021. Bloomsbury Visual Arts. [ISBN 978-1-350068-27-8. 178 pages, including index. US$40.95 (softcover).]


*design and digital interfaces: Designing with aesthetic and ethical awareness* is reader-friendly by module, chapter, or jumping to the color-coded content most relevant to the reader's interests. The book begins with examples and images that highlight the influence of digital interfaces on the self and society. The authors explore the social consequences of digital interfaces with appropriate focus on the consequences that mediate social action. The comments on social robots and the need for a more consciously ethical approach to social interfaces are especially thought-provoking. The exploration of legal and political implications of digital interfaces and their power dynamics is presented with poignant revelations. Complexities in ethical responsibility in interface design are also aptly revealed. Operational aesthetics in digital interfaces are explained, as the authors argue that digital interface aesthetics can help technologies to be empowering while avoiding inequality and bias.

Critically important is the focus in Chapter 4 on the potential unethical behaviors "enabled" by designers' digital interfaces, such as hate speech, harassment, and such. The authors use the design of Apple AirPods in-ear headphones as a familiar example of digital interaction well beyond simple visuals on screens. Chapter 5 "explores the connection between how digital interfaces are imagined and built, and the mutual feedback loop that exists between future…and present innovations (p. 109). The last chapter reflects historically with reference to the 1968 ACM/IEEE Conference introducing the relational "concept" of a computer user interface and handheld mouse, which became available to eager users 20 years later. *design and digital interfaces* closes with a warning that design imaginaries and future interface designers are to be careful with the "potential" of their creations. History has taught designers about aggressive negative reactions if their creations do not produce the demonstrable outcomes expected by their excited user fans.

Concluding the book are four interesting interviews with experts discussing interface design which add an intimate dialogue to the book's focal point. The conversations offer enticing discussion points and ponderings. A helpful glossary and detailed references close this elegantly designed, innovative, and powerful book.

**Lynn O. Ludwig**
Lynn O. Ludwig is an Associate Professor of English at the University of Wisconsin-Stevens Point, WI. Previously, she managed the IBM System Administration instructional design team in Cambridge, MA, edited rocket booster test reports for NASA, and wrote SAP user manuals for companies on the U.S. east coast and Germany.

## News Media Translation

Federico Zanettin. 2021. Cambridge University Press. [ISBN 978-1-108-47070-4. 248 pages, including index. US$29.99 (softcover).]


Federico Zanettin's *News Media Translation* offers students a densely researched and thorough introduction to the history, issues, and techniques of news translation and proposes a "novel approach" (p. 133) for minimizing the cultural distortions that inevitably arise during translation.

"Translation proper" naively assumes that translation occurs between "equal and homogeneous national languages and cultures" (p. 3), allowing "a linear correspondence between a source and a target text" (p. 1), when in fact translation "primarily" involves the "translation of cultures" (p. 31), and is therefore a "site of power differential," with power issuing "from a more prestigious to a less prestigious language" (p. 22). English, for example, is the current "global lingua franca" because translation flows "mostly from English" into other languages (pp. 22–23).

Translation evolved into "'culture as translation'" (p. 31) when printing led to the "standardization of vernaculars," increasing literacy, inaugurating the development of newspapers, and establishing the "ground for national identities" through the agency of "national languages" (p. 3). As a widely-printed language—initially French, then English—began to dominate translation, the power differentials among nations became more acute. Broadcast and digital news media further intensified the differential through their ubiquity and immediacy.

Power differentials are integrated into news translation through domestication, "transediting" (p. 81), gatekeeping, and localization; methods that render the source text acceptable to the target audience in ways that inherently reveal cultural differences. Zanettin proposes to mitigate distortions by employing inductive methods like Conversation Analysis, Critical Discourse Analysis, and Membership Categorization Analysis. A key premise of these tools is that "a constructivist approach to reality" does "not take reality as a given that has to be uncovered but as something that is construed as it is being described and explained" (p. 137). Focus on tacit communication techniques—turn-taking, body language, inferring broader categories from specifics—inductively reveals how communication, however fluid, is "regulated by conventional procedures" (p. 140).

By working from what is observed, not from predetermined theory, these tools can most neutrally reveal the differing cultural realities and the power differentials between news media accounts, as demonstrated by Zanettin's helpful case studies. These analyze how Palestinian and Israeli versions of the same incident vary; how an Italian translation of an English newspaper account of a women's rights advocate emphasizes a perspective different from the source text; and how an interpreter's struggle to translate a heated, televised political debate between an English politician and a Swiss Muslim academic reveals cultural and power differentials and the difficulty of achieving an objective translation.

Pure "translation proper" may be unattainable but understanding how particular choices by specific people in real situations influence the meaning of the translated text can only benefit a world of instantaneous news generation, distribution, and translation. For students, Zanettin's introduction to news media translation offers an in-depth historical account and an analytical method most likely to reveal the "reality" behind reported events, as far as it can be.

**Donald R. Riccomini**

Donald R. Riccomini is an STC member and was a senior lecturer in English at Santa Clara University, where he specialized in engineering and technical communications. He previously spent twenty-three years in high technology as a technical writer, engineer, and manager in semiconductors, instrumentation, and server development.

## Comic Book Women: Characters, Creators, and Culture in the Golden Age

Peyton Brunet and Blair Davis. 2022. University of Texas Press. [ISBN: 978-1-4773-2411-0. 315 pages, including index. US$45.00 (hardcover).]


*Comic Book Women: Characters, Creators, and Culture in the Golden Age* by Peyton Brunet and Blair Davis highlights the contributions of women to comic books as creators, characters, and consumers. University of Texas Press published *Comic Book Women* as part of a World Comics and Graphic Nonfiction series which, as the website puts it, "focus on the analysis and interpretation of comic books and graphic nonfiction from around the world" (https://utpress.utexas.edu/books/series/world-comics-and-graphic-nonfiction-series)

Through this book's pages of *Comic Book Women*, we're reminded of women characters such as Miss Fury, Sally O'Neil, Señorita Rio, and the Black Cat, as well as creators such as Toni Blum, Barbara Hall, June Tarpé Mills, Lily Renée, and Ruth Roche. Brunet and Davis analyze these women through the lens of genre: superhero, jungle, crime, horror, western, science fiction, and romance. Besides a chapter for each of the listed genres, there's a chapter dedicated to title characters in comics. Many of these women make reappearances throughout the book since many contributed to multiple genres.

Brunet and Davis celebrate these contributions but—most importantly—clearly state when they were problematic. For example, when discussing women in the superhero genre, they write: "At the same time, it should not be forgotten that though these superheroines opened up new avenues of representation for women to pursue, they also essentially functioned to assimilate women into the ideologies of American nationalism in more active ways" (p. 53). Brunet and Davis also recognize the oppressive representations for people of color, minorities, and members of the LGBTIQA+ community. Their sensitivity to these issues is noteworthy. I think they state it best when they write, "The roots of this struggle are far older than much of the literature about comics' history would have readers believe, but the struggle is not futile; if change is going to be made in the industry, then the characters and creators who have made inroads for that change need to be recognized for their complicated—sometimes messy, often problematic—place in this fight" (p. 259).

In conclusion, *Comic Book Women* recognizes the often-unremembered women characters and creators of the industry while recognizing their sometimes-problematic roles. After you check out this book, I expect that—like me—you'll want to check out the other books in the World Comics and Graphic Nonfiction series which explore other topics poignant such as sexuality, race, or civil rights in comic books.

**Sara Buchanan**
Sara Buchanan is an STC member and a content strategist at LCS in Cincinnati, OH. In her free time, she's an avid reader, enjoys cooking, and doting on her cats: Buffy and Spike.

## CritiC*ALL*!: (un)professional everyday design criticism

Joannette van der Veer, ed. 2021. Onomatopee Projects. [ISBN 978-9-4931-4849-9. 104 pages, including index. US$18.00 (softcover).]


Expanding design criticism has been identified as a goal by many design critics. Though these critics will tell you that design criticism is a robust field and criticism of design can be found everywhere, it has been noted that those who are participating in design criticism are deeply engrained within the design field and that the current call for more criticism is to expand into non-professional criticism, or criticism from everyday people. *CritiCALL!: (un)professional everyday design criticism* sets out to meet that goal, indeed this book is a collection of short essays on design criticism from everyday people. The book seems to stand by this as many of the writers of these critical essays are not well-known, though the introduction is written by noted design historian and critic Alice Rawsthorn and the book concludes with an interview between the editor, Joannette van der Veer, and Ellen Lupton, educator, critic, curator, and historian. Aside from these two distinguished critics, the essay authors are not established names in design criticism. Even googling most of them turns up little details, and the publisher's website, Onomatopee Press, lists most of the contributors as simply writer or critic.

Rawsthorn's introduction sets a good tone for *CritiCALL!* and reminds the readers why design criticism is important; design needs not only to be understood but it also needs to be held accountable. The essays in the collection are short, most extending only two pages while the longest tops out at six pages, making the entire collection a very quick read. Yet despite the brevity of the essays, there is some very good criticism within the pages tackling concerns from big to small including the lack of diversity in design and how online criticism affects our shared cultures. While some essays were difficult to connect with, this is probably reflected by the diversity of the writers, not a flaw of the text.

*CritiCALL!*'s design is simple, the narrow format only accommodates a single column of text, yet it is still evident that it is a book created for designers. The colophon at the end provides details on the typeface selections and including the use of GT Haptik Rotalic for headings. This typeface choice is an interesting one and features the jaunty angle of rotated letterforms as an alternative to italics would likely cause modernists to have a fit. The introduction is set apart from the rest of the text by its centered alignment, and the overall design of the book feels like an upscale zine, which will appeal to many designers. Beyond that, *CritiCALL!* will appeal to anyone with an interest in design and its criticism, from professional designers, to students, educators and even to those not actively engaged (the everyday people) within the design field but who are interested in design more broadly. This book highlights the importance of everyone and anyone to engage in design criticism, not just designers or design critics.

**Amanda Horton**
Amanda Horton holds an MFA in Design and currently teaches graduate and undergraduate courses at the University of Central Oklahoma (UCO) in the areas of design history, theory, and criticism. She is also the director of the Design History Minor at UCO.

## Life and Death Design: What Life-Saving Technology Can Teach Everyday UX Designers

Katie Swindler. 2021. Rosenfeld Media. [ISBN 978-1-933820-84-2. 250 pages, including index. US$49.99 (softcover).]

Do user experience (UX) professionals consider "use under duress" as a significant design metric? I suspect not and neither did Katie Swindler, which is why, she has written *Life and Death Design: What Life-Saving Technology Can Teach Everyday UX Designers,* a book

that will change the way you frame every design challenge and every product you use.

As Swindler observes in the Introduction, "The original concept for the book had been simple—take the fascinating and plentiful research on human stress and design from life-and-death fields like health care, the military, and avionics and see if there were lessons applicable for designers who create products for users who are under other types of 'everyday' stress" (p. xv). She is referring to design factors for a wide range of products, both digital and physical, that only become stressful when the user is pushed to their limits.

As a design strategist, Swindler writes from experience and offers examples of how design principles and insights have evolved to improve both systems and products. The information flow through the chapters is beautifully scaffolded; this is no small feat given the depth and scope of the material covered.

The initial chapters explore the Human Stress Response, The Startle Reflex, The Role of Intuition, and The Fight, Flight or Freeze Response. While you might think these droll topics, you might want to take a long, stress relieving breath. Swindler has wrapped these subjects in a warm UX blanket that leaves one thinking, "Of course, now I understand!"

Each chapter contains "The Case Of" side stories and "Design Quick Look" breakouts illustrating real life examples of failed and successful design work related to the chapter topic. The illustrations are top quality and are also available for free use under a Creative Commons license at the Rosenfeld Publishing website. Additionally, each chapter contains both an effective summary and a list of referenced sources.

After devoting the first half of *Life and Death Design* exploring the limitations, flaws, biases, and psychology of the human stress response as it relates to the UX world, Swindler now dives into solutions with the remaining chapters: Reasoned Reaction, Recovery, Alarms and Alerts, and Hero by Design.

An area I found particularly interesting was the "When to Trust the Gut" section. This section explores the reliability of intuition using the work of two respected, antagonistic, researchers Gary Klein and Daniel Kahneman. Their collaboration produced an understanding of the surprisingly clear conditions required to build expert intuition: "An environment that is sufficiently regular to be predictable" and "An opportunity to learn these regularities through prolonged practice" (p.52).

*Life and Death Design* is so insightful, comprehensive, and compelling that, besides being included in every professional UX specialist's library, it should be required reading for every UX student.

**Lynne Cooke**
Lynne Cooke is a Clinical Assistant Professor at Arizona State University where she teaches courses on usability, digital media, and portfolio development. She is also a member of the Arizona Chapter of STC and the Internship Coordinator at ASU.

## Storycraft: The Complete Guide to Writing Narrative Nonfiction

Jack Hart. 2021. 2nd ed. University of Chicago Press. [ISBN 978-0-226-73692-1. 270 pages, including index. US$18.00 (softcover).]


*Storycraft: The Complete Guide to Writing Narrative Nonfiction* takes a deep dive into the origins and significance of storytelling: from animal-headed deities on cave walls, and hunters sitting round the campfire sharing their adventures of the day (p. xii); to the Iliad and the Odyssey. Author Jack Hart argues that "the same deep-seated archetypes lurk in primal stories created by all kinds of cultures" (p. 3). Scholars suggest that storytelling has an evolutionary basis; that "certain systems of organizing information give us…a way of perceiving the world, that has helped us survive" (p. 3). As the author says, "Story makes sense out of a confusing universe by showing us how one action leads to another" (p. xv).

Neuroscience findings point to the fact that we are hard-wired for story: "that audiences actually preferred narrative presentations; that we actually remember facts more accurately if we're exposed to them in a story, rather than in a list" (p. 4). "Young children organize their play around storytelling that fits classical narrative form…Story is so central to the lives of young children that it comes close to defining their existence" (p. 6). In short, "storytelling is even more deeply-rooted in our biology than we suspect" (p. 7).

The three basic story elements are plot, characterization, and setting. But different genres tend to develop them differently. Hart compares characterization in these different genres. Fiction, he

says, tends to be much more character driven. "The novel rises or falls on the strength of its characters." Great novels somehow "change the way we see the world," and they do so through the people who live on its pages (p. 73). By contrast, people in nonfiction tend to be "shadows that reveal only the faintest outline of a complete human being" (p. 74).

He compares newspaper and magazine articles, noting that magazine writers do better than hard-core journalist reports. But they're still little more than "stick figures" (p. 74). "The genius of modern narrative nonfiction is that it has replaced the journalistic who, what, where, when and why—with character, plot, and scene; putting character in the driver's seat" (p. 74). This special insight is from Hart himself, who has a journalism background.

Hart also has good comments on setting, or what he calls scenics. He suggests that "We're hardwired to absorb stories by scenes" (p. 87). The novel, like the play before it, takes its shape from a series of scenes." A radio drama creates a succession of imagined scenes. The movie is exclusively scenic (p. 87). As one writer put it: "Setting is the gift wrap; story is the gift" (p. 88).

Think of the power of a single image in a story or song, to evoke a complete feeling. Can you remember, for example where "the words of the prophets" were written, in the song "The Sound of Silence?"

**Steven Darian**
Steven is a Professor Emeritus at Rutgers University. He has taught in over nine countries with three as a Fulbright Visiting Professor. He has written books on business and technical communication, understanding the language of science, comparative religion, a historical novel, two travel books, and his own, *Technique in Nonfiction: The Tools of the Trade.*

## Teaching Environmental Writing: Ecocritical Pedagogy and Poetics

Isabel Galleymore. 2021. Bloomsbury Academic. [ISBN 978-1-350-24327-9. 206 pages, including index. US$39.95 (softcover).]


*Teaching Environmental Writing: Ecocritical Pedagogy and Poetics* is a critical examination of pedagogy associated with nature and environmental writing courses in the United States and the United Kingdom. Isabel Galleymore draws on interviews from mostly post-secondary teachers of nature and environmental writing and "guidebooks on the subject published between 1985 and 2017" (p. 4). Her goal is to provide guidance on environmental writing and "deepen ecological consciousness and advance new routes into writing about the world we inhabit" (p. 4) by reimaging pedagogy that uses ecocritical theory infused with poetry.

The book covers important ground on critical stances regarding place, use of first person, metaphor, and authenticity in nature and environmental writing. Each chapter is an extensive, detailed academic rumination on ecocritical theory as it pertains to these topics.

Regarding Galleymore's argument that nature and environmental writing pedagogy can be enriched through poetry, she pays considerable attention to poets and poetry that exemplify her proposed pedagogy. For instance, there is substantial debate on how teachers should instruct students to write about place. Should students be encouraged to learn proper names of trees and plants? Should they focus on local places to foster consciousness of their immediate surroundings? Or should they be encouraged to make global connections through local observations? Should they be looking for spiritual connections with nature? Galleymore explores these and many other questions through her critical examination of several poets and their poems, most especially through the poetry of Juliana Spahr.

By deconstructing several of Spahr's poems in chapter 1 on place writing, Galleymore hopes to "prompt teachers and students to take up her [Spahr's] writing as a valuable introduction to place as both a local and a global concept" (p. 56). Similarly, in subsequent chapters, Galleymore uses Jorie Graham's poetry to discuss best practices for the use of first person and Les Murray's work for critical stances on anthropomorphism. Although there is a focus on these three poets, many other poets and their poems are examined in each chapter.

Readers should know that *Teaching Environmental Writing* is categorically a scholarly publication, which affects how it will be received and read. For those teachers who are looking for innovative, practical pedagogical discussion and materials, the reading may be more complex and difficult to get through than expected. Likewise, for readers who are not familiar with poetry or comfortable teaching poetry, the material can be overwhelming and possibly even have the opposite effect that Galleymore says she hopes for,

which is to infuse nature and environmental writing pedagogy with poetry. The point is that the book reads like a dissertation, so those who do not have a strong background in ecocritical theory or poetry may find themselves lost, and may, unfortunately, dismiss or overlook insightful arguments and analyses regarding best practices for teaching nature and environmental writing, especially if teachers are looking for ways to encourage their students to make global connections. Readers who do have expertise in these areas may find the book easier to read and grasp Galleymore's pedagogy with more confidence and understanding.

**Diane Martinez**
Diane Martinez is an associate professor of English at Western Carolina University where she teaches technical and professional writing. She previously worked as a technical writer in engineering, an online writing instructor, and an online writing center specialist. She has been with STC since 2005.

## Tomorrow's Communities: Lessons for Community-Based Transformation in the Age of Global Crises

Henry Tam, ed. 2021. Policy Press. [ISBN 978-1-44736-111-4. 254 pages, including index. US$45.95 (softcover).]


Governments are unreliable sources of aid for disadvantaged communities. Even with the best intentions, policy and funding change in response to polls and with each election. Moreover, governments rarely understand the true issues communities face. In *Tomorrow's Communities: Lessons for Community-Based Transformation in the Age of Global Crises*, a collection of 14 essays, Henry Tam and his colleagues answer the question of how to do what governments won't: empower communities to meet their own needs.

The key? Build and nurture self-sufficient, mutually supportive communities that can sustain long-term development by taking on government roles. Communities often do this more efficiently because they understand the problems and opportunities better. Of course, some problems are too big for communities alone, and require government assistance. Tam and his authors recommend "subsidiarity": delegating power and accountability to the level that's best suited to use that power. "Think global, act local" captures this approach: local community actions can, if adopted widely, begin solving the global crises of the title.

Contributor John Restakis wonders (p. 195): "What if an entire economy was based on the premise that it is the social worth of an action that generates its value?" This reflects the book's emphasis on a human focus for solutions. Tam suggests three principles to accomplish this at a community scale: cooperative enquiry (working together to develop a shared understanding of the situation), mutual responsibility (collective action to promote collective well-being), and participatory planning (so that all voices are heard).

Contributors provide concise case studies and cite others, thereby grounding the book's theory in the real world. Examples are weighted towards the United Kingdom, but it's clear how to apply the lessons to other contexts after accounting for cultural and institutional differences. Although the writing's clear, *Tomorrow's Communities* seems written more for researchers; as a result, authors often forget to define key terms, which can be disorienting until context reveals the meaning. The authors also occasionally overindulge in jargon, though I rarely lost the thread.

Communities create powerful flows of information and resources. Technical communicators can apply our audience analysis skills to this context. We can identify sub-communities, their distinct needs, and ways to meet those needs. Ongoing communication's essential for any community-based project, and that's another opportunity: we can help leaders understand their audiences and manage expectations, facilitate communication among sub-communities, document and explain information, and identify knowledge gaps to fill.

If we want to change the world, we should start at the community level and build upward. During two pandemic years, I've found myself fibrillating over how to help. Tam's book helped defibrillate me and put me back on the path towards striving for meaningful change. *Tomorrow's Communities* isn't a "how to" manual, but it provides a clear understanding of the community development context and a sound foundation on which to build.

**Geoff Hart**
Geoff Hart is an STC Fellow with more than 35 years of writing, editing, translation, and information design experience. He's traveled widely and worked with authors from many cultures. He's the author of two popular books, *Effective Onscreen Editing and Writing for Science Journals.*

## The Art and Craft of Asian Stories: A Writer's Guide and Anthology

Robin Hemley and Xu Xi, eds. 2021. Bloomsbury Academic. [ISBN 978-1-350-07654-9. 268 pages, including index. US$37.95 (softcover).]

Many STC members also write fiction, and like most writers, eagerly seek new insights into their craft and new techniques. In *The Art and Craft of Asian Stories: A Writer's Guide and Anthology*, editors Robin Hemley and Xu Xi gather 24 broadly representative stories from India to Japan and throughout the Asian diaspora. The chosen stories have no uniquely Asian story structure or style; on the contrary, they reveal how strongly human concerns and modes of expression span cultures. Nonetheless, Asian cultures emerge clearly from each story's characters, context, and details.

Hemley and Xu's goal is to teach new techniques we can try: "Our aim is to widen the field of models for students of any background from any country" (p. 1). Rather than grouping stories based on micro-scale features such as dialog or plot, they treat each story as an organic whole, in which all parts work together. Examining parts (dialogue) in isolation would lose the synergies that make a story work.

The stories have diverse styles, so (as I did) you're bound to find several you really enjoy. They're grouped into 11 themes, from "family" to "invaders." Because the anthology's goal is to teach new ways to think, Hemley and Xu encourage us to consider the stories "not as literary critics but as fellow writers trying to understand how to bring the reader most fully into the experience" (p. 16). There's abundant excellent writing advice, illustrated well by the companion story. Unfortunately, the authors occasionally throw up their hands and refuse to explain an authorial choice that seems purposeless, leaving us to figure it out. That might be justified in a different kind of book, but not in one intended to explicate why writers make specific choices.

Each section begins and ends with a discussion of the stories and exercises you can use to apply what you've learned. This makes the book highly suitable for a writing course. The tone is pleasantly irreverent about the writer's craft, while remaining respectful of the writers and their stories. For example, "Think of several societal taboos and write them down. Next, don't write a story about any of them. Spare us and yourself the embarrassment please. Now, write down several activities that you consider normal and not taboo at all. Choose one and write about it as though it were as forbidden a taboo as the ones on your first list" (p. 221).

The pleasure of reading these stories is diminished by poor typography (a tiny font with too-wide lines). If, like me, your vision isn't what it used to be, choose the eBook format instead.

**Geoff Hart**

Geoff Hart (www.geoff-hart.com) is an STC Fellow with more than 35 years of writing, editing, translation, and information design experience. He's traveled widely and worked with authors from many cultures. Besides his non-fiction, he's published 49 short stories, a self-published story collection, and a few novels.

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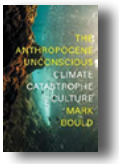
## The Anthropocene Unconscious: Climate Catastrophe Culture

Mark Bould. 2021. Verso Books. [978-1-83976-0-471. 176 pages, including index. US$19.95 (hardcover).]



Human activity is having an environmental impact on our planet. Some people consider this period, known as the Anthropocene, to be a geological age. Mark Bould makes a comment about this period in *The Anthropocene Unconscious: Climate Catastrophe Culture* that the Anthropocene has become part of humanity's unconscious. He concludes this by looking at genres including movies and books that he feels reflect what he calls a climate catastrophe culture. This culture reflects how climate change and environmental catastrophe are central issues in our Anthropocene time.

An example of Bould's commentary includes his thoughts on the *Sharknado* movie and its sequels (pp. 19–21). These combination science fiction, comedy, and disaster movies reflect Bould's concept of the Anthropocene unconscious. While the plots of these movies are comical, there could be some serious concerns here as the movies tap into the unconscious fears people have. Consider how Bould states the "first recorded sharknado" (p. 19) was in 2013 with Hurricane David as the author further states that "three massive waterspouts that would tear through the city formed and hurled sharks at unsuspecting Angelenos" (p. 19). Bould's commentary here is an example of his thinking on the central idea of environmental catastrophe becoming part of our unconscious as

reflected in a movie that might make us laugh while still acknowledging a fear of an impending catastrophe.

In general, Bould's comments in *The Anthropocene Unconscious* cover a huge scope of references to not only include a movie such as *Sharknado*, but also the *Fast and Furious* franchise as well as references to works of literature such as Melville's *Moby Dick* and references to the writing of Jane Austen. The author's connections and comments can be a bit wild, but they are also thought provoking. He often combines a scholarly type of explanation to a non-scholarly subject out of popular culture. Consider this quote as an example from the chapter he devotes primarily to comments about *Fast and Furious*. "From sharknadoes to slow cinema, from slabs of bourgeois solipsism to the crepuscular domain of ligneous lives, we have seen the Anthropocene lurking within texts that have little or no idea that that is what they are talking about" (p. 131).

In our professional and personal lives, we can ask ourselves what should and can we do based on what Bould observes about our collective unconscious about environmental catastrophes and our fears. Should we try in our own way to lessen the negative impact we have on our planet and that way address at least in part what concerns us in our collective unconscious about possible climate-related catastrophes? Could this mean at the very least drinking from a reusable cup, using fewer plastic bags when shopping, and, of course, looking out for massive waterspouts that could hurl a shark at us?

**Jeanette Evans**
Jeanette Evans is an STC Associate Fellow; active in the Ohio STC community, currently serving on the newsletter committee; and co-author of an *Intercom* column on emerging technologies in education. She holds an MS in technical communication management from Mercer University and undergraduate degree in education.

## The Pivot: Addressing Global Problems Through Local Action

Steve Hamm. 2021. Columbia Business School Publishing. [ISBN: 978-0-231-20090-5. 294 pages. US$24.95 (hardcover).]


"We believe that recovery from COVID-19 can be a catalyst for achieving Net Zero carbon emissions by 2050 and accomplishing the UN's global sustainable development goals for health, education, and equitable prosperity." This quote comes from the Pivot Project site at https://www.pivotprojects.org/post/pivot-projects-and-the-pivot and gives an idea of what is meant by the "pivot" described in *The Pivot: Addressing Global Problems Through Local Action*.

The Pivot Project initiative is a global volunteer collaboration formed as the COVID-19 pandemic started. Steve Hamm documents this initiative's efforts in the book. A central idea that Hamm discusses is whether the world will be transformed after coming out of the COVID-19 pandemic. Could societies suffering from issues such as income inequality, climate change, and racism overcome these issues with the shock of a pandemic causing people to "pivot" to a better way of life? Hamm addresses the question when he explains how members of the Pivot Project collaborated to achieve impressive results while modeling how to achieve systemic change.

While some Pivot Project members come from the humanities and the sciences, other members are environmental activists or "regular" people. These people have a variety of personalities and skills. So, how did they get things done? In explaining the methods used, Hamm looks at concepts and technologies such as complexity theory, systems thinking, and artificial intelligence. He also provides informal profiles of a few Pivot Project group members. These are impressive people trying to make the world a better place.

Using a nonlinear design process to come up with her Pivot Project, Ahn Nguyen is a Vietnamese fish exporter studying in Sweden and Pivot Project member. She implemented her idea for raising and transporting salmon on a cargo ship with the approach coming in part from answers generated by an artificial intelligence machine. With Nguyen's new use of the cargo ship, production and distribution were combined to save energy and money (p. 105). She says she is no longer afraid of uncertainty as her idea helped in its own small way with the issue of effective and improved food distribution.

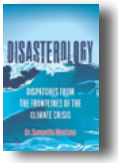
Nguyen's profile appears in the Chapter 4, Struggles. This chapter is one of an eclectic mix of ideas with other chapters called the Scrum, Places, Remapping the World, and Talking to Robots. These chapter titles give an idea of what topics and approaches Hamm covers.

Of course, I think I could not do anything in my professional or personal life as impressive as a Pivot Project. But maybe I should think more about what I could do locally to make this a better world as should we all.

**Jeanette Evans**
Jeanette Evans is an STC Associate Fellow; active in the Ohio STC community, currently serving on the newsletter committee; and co-author of an Intercom column on emerging technologies in education. She holds an MS in technical communication management from Mercer University and undergraduate degree in education.

## Disasterology: Dispatches From the Frontlines of the Climate Crisis

Samantha Montano. 2021. Park Row Books. [ISBN 978-0-7783-1103-4. 380 pages, including index. US$28.99 (hardcover).]




Disasterology is a science that combines mitigation (detection and reduction of risks) with preparation (developing plans and response capacity), response, and recovery. Disaster managers determine how to cope when emergencies (which can be handled with local resources) evolve into disasters (which require external support) and disasters into catastrophes.

*Disasterology: Dispatches From the Frontlines of the Climate Crisis* begins with an anonymous epigram: "At the start of every disaster movie, there's a scientist being ignored." The sentiment's familiar to any scientific communicator. Unfortunately, unlike disaster movies, life doesn't promise a happy ending. New Orleans after hurricane Katrina taught many Americans that governments can no longer be trusted to protect them from disasters or help them recover. This isn't just an American problem.

Disasters rarely happen without warning; most are preceded by slowly accumulating signs that governments ignore, particularly for "something happening to people [you] did not know in a city [you] had never seen" (p. 28). Montano reminds us that a disaster's visible damage may be impressive, but it's less important than the severe but invisible damage to victims. Survivors "are not a life lesson for [us]. They are people...who need [our] help" (p. 94).

Though supported by an extensive literature review, *Disasterology* isn't a scholarly book. It's a deeply personal, often infuriating, account of Montano's journey. She anchors her story in the government's ineffective response to restoring New Orleans, where Montano worked as a volunteer, and ends with the catastrophic mishandling of the COVID-19 pandemic. It's not a comforting read, since the "inherent heartbreak of disaster work [is that] no matter how much good you do, it won't ever be enough" (p. 78).

The biggest problem is that governments at all levels emphasize reactive approaches, which are insufficient, too expensive, and too slow. Instead, we must push governments towards a proactive approach designed to reduce disaster frequency and severity. The book's subtitle reminds us that it's no longer a question of *whether* we'll suffer from climate change, but rather how badly and whether we'll act soon enough to reduce the suffering.

Disadvantaged communities are disproportionally affected. They pose a difficult communication challenge because they often combine low education and literacy with strong distrust of government. Impenetrable government language and strangling red tape exacerbate these problems. Oral communication becomes important and requires the ability to translate complex information into something normal people can understand. The news media and social networks are also essential, since no news *does not* mean good news: "In a disaster, silence is the scariest sound" (p. 226).

Climate change is already increasing disaster frequency and severity, and we can no longer afford to simply create plans that will be shelved and forgotten. Instead, these plans must become living documents that help us work together and force governments to act now to reduce the risk of disaster and allocate sufficient resources to reduce the human cost.

**Geoff Hart**
Geoff Hart (www.geoff-hart.com) is an STC Fellow with more than 35 years of writing, editing, translation, and scientific communication experience.

## Supporting New Digital Natives: Children's Mental Health and Wellbeing in a Hi-Tech Age

Michelle Jayman, Maddie Ohl, and Leah Jewett, eds. 2021. Bristol University Press. [ISBN 978-1-4473-5645-5. 210 pages, including index. US$45.95 (softcover).]


Mental wellness and digital technology are traditionally not viewed as collaborative partners, especially in youth development. The negative aspects of digital technology include cyberbullying, inappropriate visual content, social media competition, and the (sometimes) misconception of "too much screen time." However, nobody can dispute that exposure to technology is unavoidable—from online homework to discussion groups on Zoom, students are required to have an email address in early elementary school. With the new reality of technology-savvy younger children, it is critical to figure out the implementation of it for maximum benefits/fewest risks and how to impose critical boundaries. To this end, *Supporting New Digital Natives: Children's Mental Health and Wellbeing in a Hi-Tech Age* was compiled in ten chapters with sources at the end of each chapter, a section on the background of the contributors, a glossary, and index. The editors selected eight case studies by health care providers, teachers, and mental health professionals/researchers to approach mental wellness from a complex wholistic landscape rather than examining any one influencing factor.

"These eight case studies were selected because of their original contributions, each focusing on different aspects of CYP's (children and young people) lives which are inextricably linked to mental wellbeing, such as friendships and relationships, play and learning experiences, and opportunities for connecting with nature and the community. More than this, each chapter is a platform for raising CYP's voice, rightly placing them, as experts in their own lives, at the heart of mental wellbeing interventions and services" (p. xxx).

Ironically, the first case study on supporting new digital natives (as the title states) introduces a pyramid club that removes children from all technology and places them in an intentional support group—an environment where they can practice relationship building in a supportive place. For ten weeks, kids meet with other kids who either lack social skills and/or have trouble with friendships. During these ten weeks, the kids do activities targeted toward connection, building teamwork, and creating a safe space like arts and crafts, food preparation and sharing, and circle time. This approach contrasts with the next case study in which *Book of Beasties* is used to explore how to get children to build virtual friendships through an online card game. "Children learn best in interactive environments which *invite them in* as interactive collaborators and include content which is meaningful to them" (p 96).

One of the common negatives associated with digital technology is the reduction of outdoor play for children—this is the basis of Forest School and Girlguiding. These case studies look at the effects of nature on the mental wellbeing of youth and the importance of building a support community. In the girlguiding study, the implementation of digital technology has improved some of the programs and the girls are encouraged to use the technology if it helps them.

One of the final case studies introduces LifeMosaic—an app for a smartphone that tracks various data points that might help children understand their mental health better. For example, after tracking sleep and diet they might see the link between poor eating habits and poor sleep quality—and their overall mood as a result. The app allows children to design their own study and then plot graphs and charts which can be shared within their online LifeMosaic community.

All these studies describe either the use of technology to enhance mental wellbeing or the intentional removal of technology to eliminate a technology-driven issue—the intersection of which is a balance the new digital natives of our generation will be forced to eventually navigate themselves.

**Julie Kinyoun**
Julie Kinyoun is an on-call chemistry instructor at various community colleges in Southern California. An avid reader, she enjoys reviewing books that help her become a better educator.

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## You Should Write a Book

Katel LeDû and Lisa Maria Marquis. A Book Apart. [ISBN 978-1-952616-13-6. 140 pages, including index. US$24.00 (softcover).]


It takes time and effort to turn your idea into a book, but with humor and inspiration from Katel LeDû and Lisa Maria Marquis, you might find that it's easier to accomplish

than you imagined. In this case, we are talking about sharing your career smarts with the industry.

Maybe you've got some Python programming panache, know some web design wizardry, or have the scrum master mojo. Whatever your technical or professional subject, the guidance the authors provide in *You Should Write a Book* will set you on the right path to publication. LeDû and Marquis are big believers that adding your voice and perspective to the industry matters; if you *want* to write a book, you *can* write a book.

The book starts with a brief history of publishing to frame the authors' argument that your finished book isn't at the mercy of large publishing houses; self-publishing and niche publishing companies are viable options. This segues to dismantling your own insecurities about writing and publishing. Their bottom line is that you don't have to be an expert, you don't need to know all the answers, and it's not a matter of knowing the right people.

LeDû and Marquis help you plan the journey of getting your book out of your brain so you can develop your ideas. They describe the process of identifying your audience and solving their problem, building your narrative, and arranging your ideas to shape your story. If you need advice or encouragement in developing your writing practice and managing your schedule, they cover that, too.

The chapter on editing shares advice on reviewing your manuscript without feeling overwhelmed by the need to fix everything. They explain how to edit for voice and tone, recommend ways to be inclusive and avoid assumptions, and give pointers on tidying up and managing your heading and sub-heading hierarchy.

*You Should Write a Book* even gets into the decisions you'll make about paper stock weight and finish, creating eBooks and audiobooks, and distribution methods.

By the time you get to the chapter on preparing for publication, you'll be ready to tackle all-important tasks like finalizing the title, crafting your dedication and acknowledgements, requesting testimonials in the form of blurbs and a forward, and approving the overall book description.

The breadth and depth of *You Should Write a Book* and the right amount of humor and empathy for the process make it an engaging read to help you navigate writing and publishing your career-inspired manuscript.

**Michelle Gardner**

Michelle Gardner is a contracted senior writer at Microsoft focused on their cloud portfolio. She has a bachelor's degree in Journalism: Public Relations from California State University, Long Beach, and a master's degree in Computer Resources and Information Management from Webster University.

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## Teaching Writing in the Health Professions: Perspectives, Problems, and Practices

Michael J. Madson, ed. 2022. Routledge. [ISBN 978-0-367-75552-2. 204 pages, including index. US$143.00 (hardcover).]

According to Michael J. Madson, editor of *Teaching Writing in the Health Professions: Perspectives, Problems, and Practices*, the importance of teaching writing in the medical curriculum has been recognized since 1953. However, the ways in which writing has been taught to medical students and students in the allied health fields has historically varied in quality, quantity, and instruction method.

In Madson's book, he and other authors use evidence-based methods to explore best practices in teaching students in the health fields to write in the genres they will use daily as practitioners. Many medical students underestimate the importance of medical writing, expecting to simply click boxes in a computer-based health record system. However, their clinical notes, patient-care plans, patient medical histories, patient educational information, and other writing can impact a patient's health as well as affect insurance billing and reimbursement. Further, clear medical writing can improve health literacy for both the patient as well as the public.

Perhaps the greatest strengths of *Teaching Writing in the Health Professions* are the variety of health fields represented in the collection and the credibility of the contributing authors. In medical writing texts the focus is often on the physician; however, in Madson's collection, he highlights writing in nursing, pharmacy, emergency medical services, and other medical fields. Further, the authors are experienced both as practitioners and as academics in their respective fields. Many of these authors, such as Elizabeth L. Angeli, have written extensively on health communication and are recognized experts on medical writing.

The chapters within *Teaching Writing in the Health Professions* are varied according to profession, country, and even the ages and levels of education of the students being instructed. The chapters discuss a variety of methods for teaching writing, including the use of writing centers, templates, workshops, and writing retreats. Each chapter presents a clear outline of the curriculum or method of instruction under investigation. The potential benefits and drawbacks of each method of instruction are discussed in plain, accessible language without cumbersome medical jargon.

*Teaching Writing in the Health Professions* is intended for academics, including technical writing instructors, and clinical instructors teaching medical writing. Many technical writing instructors teach introductory technical communication to medical and allied health students, where this genre-specific information and the examples presented within the text could help students understand the importance of writing within their fields. This collection is also appropriate for technical writing practitioners within the health fields, as well as graduate students in a health writing or medical rhetoric class.

**Nicole St. Germaine**

Nicole St. Germaine is a professor in the Technical and Business Writing Program at Angelo State University, as well as a freelance writer and consultant. Her research interests include technical communication for a Mexican American audience and technical communication in the health fields.

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## Making Research Matter: Steps to Impact for Health and Care Researchers

Tara Lamont. 2021. Bristol University Press [ISBN 978-1-4473-6115-2. 198 pages, including index. US$34.95 (softcover).]


"Researchers start their work wanting to make a difference. The extra steps and actions set out in this book and elsewhere to reach and engage people in meaningful ways, paying attention to story, language and appropriate channels are part of the job of a researcher in the 21st century. Research findings should not stay in the library or on the university bookshelf. They should be translated and worked up with the right communities into new policies, decisions, conversations and practice" (p. 166). This summary statement of *Making Research Matter: Steps to Impact for Health and Care Researchers* by Tara Lamont embodies her argument that the relevance of current research and its resulting impact on society are critical now more than ever.

Lamont's introduction uses her own storytelling tools of chapter 8, the example of Florence Nightingale and her report to the Indian Sanitary Commission, published in 1863. The "pull" Nightingale created for her report included concise and orderly summaries with vivid images. These briefs were circulated among people like John Stuart Mill and even Queen Victoria- people whose support she would need later in promoting the policy and reforms suggested in her report. Nightingale forged ties with decision makers who could implement reforms themselves or communicate with others for influential changes. And she did it all without Twitter, Facebook, and LinkedIn! It is proof that the skills of impact for research resonate then as they do now despite the vast difference in the technological tools available.

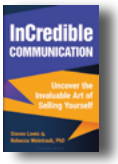
*Making Research Matter* starts each chapter using the Why, What, Who, When and How format. The Why follows the introduction to clarify the overall importance of her book. In the current information and digital climate, the sheer amount of research available has increased exponentially. It is important for people to discern valuable research from either false data or irrelevant results. Valuable research involves asking the right questions of the population involved. One example compared mechanical devices to manual compressions in treating cardiac arrest in an ambulance. A high-quality research study proved that the outcomes for each showed negligible difference, and therefore the cost of implementation was not worth it. However, when staff were interviewed, they said that the technology allowed them to sit securely in a seatbelt which made them feel safer. This detail addressed a separate issue from cost analysis and could only be determined through interviewing the right people.

Lamont's arguments for increased communication and interaction between researchers, policy makers, and lay people describes an ideal culture of collaboration, support for necessary reform and openness to change. It is her hope that researchers in all areas of health and care examine their skills, interest, and investment in this type of exchange for the enhanced quality, relevance, and implementation of valuable research findings into all areas of healthcare and wellness.

**Julie Kinyoun**
Julie Kinyoun is an on-call chemistry instructor at various community colleges in Southern California. An avid reader, she enjoys reviewing books that help her become a better educator.

## InCredible Communication: Uncover the Invaluable Art of Selling Yourself

Steven Lewis and Rebecca Weintraub. Bloomsbury Press [ISBN 978-1-4729-9172-0. 238 pages, including index. US$28.00 (hardcover).]




*InCredible Communication: Uncover the Invaluable Art of Selling Yourself* is like a trip to the gym. You don't want to go there because it's hard work, but you love the results.

The publisher has chosen an unfriendly, dense, small serif font laid out in big text blocks as though they are just daring you to try and read it. And Steven Lewis and Rebecca Weintraub, both highly qualified in this field, seem intent on padding an already overly dense volume with every tidbit of information acquired in their combined 75 years of teaching.

Chapters 2–5, for example, could easily be synopsized in one good paragraph or a few of the following bullet points:

- First impressions count and it's hard to regain credibility
- Communication cultures vary from one organization to another
- What people experience is what they believe
- Context matters, and it is variable and changeable

But enough with the flaws; let's get to the rewards as they are substantial.

First off, Chapter 1 offers an excellent, detailed, self-assessment rubric—that is if you can grit your teeth and wade through an irritating layout with awkward wording. Most importantly, the framework created in this analysis is used as an invaluable template throughout the most innovative section of the volume, Part Three: Practical Advice – Becoming an InCredible Communicator.

This self-assessment rubric explores five prime Communication Dimensions and how, based on your results, you fit into the communication culture network. These dimensions include how you convey, receive, and prepare information; your communication personality and how you relate to others. The authors' breakdown of techniques is a perfect handbook for the serious communicator who understands the value of style-flexing, an innovative concept that seems to have fallen out of vogue.

The book's format is creatively applied to a variety of typical communication trouble areas from conflict to storytelling to zooming to high anxiety. The authors dissect each challenging issue in detail using the five dimensions with keen attention to how your strengths and weaknesses play out and how to make substantive changes. A detailed "tips chart" is the backbone of each chapter, which offers a focused, quick reference guide.

So, don't let the lack of style that immediately jumps out at you and screams "I'm an impossible read" stop you from exploring *InCredible Communication*. You need to think like a gold miner; just keep digging a little deeper and you will strike the rich vein of intellectual ore marked on the authors' treasure map.

**Lynne Cooke**
Lynne Cooke is a clinical assistant professor at Arizona State University where she teaches courses on usability, digital media, and portfolio development. She is also a member of the Arizona Chapter of STC and the Internship Coordinator at ASU.

## Should You Believe Wikipedia? Online Communities and the Construction of Knowledge

Amy S. Bruckman. 2022. Cambridge University Press. [ISBN 978-1-108-74840-7. 260 pages, including index. US$19.99 (softcover).]


Amy Bruckman, Professor and Senior Associate Chair in the School of Interactive Computing at Georgia Tech, has been publishing about online communities for many years. Her *Should You Believe Wikipedia? Online Communities and the Construction of Knowledge* essentially brings together her thinking on the potential in social creation of knowledge, pitfalls to watch out for, ways to invent through online resources, and developers' responsibilities.

She notes that forms of "peer production" can include "open-content publishing (Wikipedia), open-source software, citizen science, and online creative collaboration" (p. 36). She focuses on the definition and design of online communities, the possibility of positive achievement in these communities, the credibility of Wikipedia, effects of the internet on our

thinking, online personal identity, remedies for bad online behavior, and the impact of business on online communities.

Each main chapter concludes with "Theoretical Summary" and "Practical Implications" sections. Thus, the chapter on business theorizes about the impact of business; "Practical Implications" include the realities of payment to use a site, the cost to manage behavior, and different ways to finance a site.

Most interesting are the examples of and solutions to poisonous bad behavior, particularly when Bruckman addresses public shaming. She sensibly advocates three possible ways an individual can respond: "advocate for change within the platform" (p. 223), go elsewhere, or form a new subgroup.

Faith in our ability to engineer needed improvements gives *Should You Believe Wikipedia?* a positive tone. The rallying cry: "Design features of online communities shape human behavior. We can leverage those features to encourage more thoughtful discussions, greater mutual understanding, and the growth of knowledge" (p. 229).

*Technical Communication* readers will find some omissions. Bruckman doesn't mention LinkedIn, which has elicited much discussion regarding its published policies on its online communities. We might also benefit from having more than one page devoted to such fact-checking services as FactCheck.org. Finally, there should be some mention of usability testing of sites preceding reliance on visitors to flag bad content.

At times Bruckman sounds out of her element: "Refereed journal articles are arguably the 'gold standard' for quality of information. However, a refereed journal article is reviewed typically by three experts. How do you compare three experts to hundreds of self-selected volunteers?" (p. 81)—few serious researchers would subscribe to this logic. Interestingly, elsewhere she commends the superiority of "peer-reviewed scientific publications" (p. 67).

Much of Bruckman's thinking, as valid as I find it, is not new. She cites Yochai Benkler's contention "that peer production is a fundamentally new phenomenon" (p. 45), but his paper is two decades old. Her own works that she cites are two decades old. I believe that most technical communicators have long shared her thinking. *Should You Believe Wikipedia?* will enlighten general readers who have seen none of the dozens of books and articles recently published on peer communities. Readers of this journal will likely find it instead a pleasant review of what they've long accepted.

**Avon J. Murphy**
Avon J. Murphy is an STC Fellow who serves the Society as a researcher and as editor of the annual Summit Proceedings. A onetime college professor and government writer, he is a technical editing contractor and the principal in Murphy Editing and Writing Services, based in western Washington.

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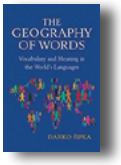
## The Geography of Words: Vocabulary and Meaning in the World's Languages

Danko Sipka. 2022. Cambridge University Press. [ISBN 978-1-108-79501-2. 256 pages. US$34.99 (softcover).]




Danko Sipka's *The Geography of Words: Vocabulary and Meaning in the World's Languages* explores the "inextricable embeddedness of languages in their respective cultures" (p. 102). Cultures share common experiences like time, kinship, or sports, but interpret them differently. Those differences are reflected in languages, and result in "global lexical diversity" (p. 3).

Sipka's book draws from the works of the anthropologist Edward T. Hall and the linguist Roman Jakobson. Like Hall, Sipka distinguishes between low- and high-context cultures. In the former "one tells things directly," in the latter "much needs to be inferred from context" (p. 8), a distinction often illustrated by contrasting American directness with Japanese indirectness. Like Jakobson, Sipka observes that "languages differ not in what they may express but rather in what they have to express" (p. 3). In Russian the sky is either "sky-blue" or "deep-blue" but not just "blue"—English can make the same distinction, but "it is not obligatory; one can simply say *blue*" (p. 3).

These two principles combined define the central theme: languages may express understanding of common, cross-cultural experiences, but inevitably do so in ways unique to each culture. Each language "bears an indelible mark" of its "space and time" and in "each culture, that mark is different" (p. 219).

Hence the familiar problem in translation, captured in the Italian adage, "*Traduttore, Traditore*!" or "translator, traitor" (p. 87). However scrupulous and knowledgeable the translator, inevitably there

will be misinterpretations "predicated on profound lexical and other differences between languages, which concurrently reflect cross-cultural differences" (p. 91). An English speaker may say "*I missed the bus*," but a Slavic speaker would say, "'The bus ran away from me'" (p. 199). Each language describes the same situation, but within opposing cultural paradigms: individualistic English speakers make themselves the cause of the effect, deterministic Slavic speakers do the opposite (p. 199).

In this example, a translator would switch cause and effect from one language to another, accurately communicating the basic situation—the rider did not get to the bus on time—so that it made cultural or idiomatic sense to the listener. The idiomatic translation, however, unavoidably shifts the cultural assumption in the original language about who bears responsibility for missing the bus, thereby effacing the difference between individualistic English and deterministic Slavic cultures (p. 201). This example (typical of the plethora provided) illustrates Sipka's argument that "diversity in human languages is a kind of adaptation to the cultural niche every language occupies" (p. 219).

Sipka adopts a playful tone and sprinkles the text with puns, wry comments, and humorous illustrations. One can read straight through or "hop from one chapter to another" (p. 2). Though "intended for a general audience" (p. 2), the book can also serve as a source of examples for teaching introductory linguistics. Sipka has achieved his goal and more: a book for both general readers and linguistics instructors.

**Donald R. Riccomini**

Donald R. Riccomini is an STC member and Emeritus Senior Lecturer in English at Santa Clara University, where he specialized in engineering and technical communications. He previously spent twenty-three years in high technology as a technical writer, engineer, and manager in semiconductors, instrumentation, and server development.

## The Complete Guide to Absolutely Everything (Abridged): Adventures in Math and Science

Adam Rutherford and Hannah Fry. 2021. W.W. Norton & Company, Inc. [ISBN 978-0-393-88157-8. 304 pages, including index. US$24.00 (hardcover).]


*The Complete Guide to Absolutely Everything (Abridged): Adventures in Math and Science* by Adam Rutherford, a geneticist, and Hannah Fry, a mathematician, delivers on exactly what the title promises, covering everything from evolution to love and so much in between. Rutherford and Fry also host the BBC Radio show *The Curious Cases of Rutherford and Fry* together; a show where they attempt to answer listener's questions with science and math. I've never listened to the show, but plan to after reading this book. The chemistry between Rutherford and Fry is obvious even in the book's pages. They're smart but not too smart for me or you, they're funny, and they don't take themselves too seriously. Even if (like me) your eyes gloss over at the math and science bits, you're sure to enjoy this book.

Though, as they discuss in chapter 6, I—and you—may be predestined to enjoy this book and leave a "glowing five-star review" (p. 148) simply because of forces we have yet to understand. Assuming I have free will, my enjoyment of this book—and my review—are the result of their skillful writing. We'd all like to believe that, wouldn't we? But Rutherford and Fry make a compelling case that we might not have free will at all. Of course, they just present the facts and then very safely end the chapter by saying, "As for us, we didn't promise that we would answer this question, but we were always fated to ask. We know you believe that you have free will. We do too. But what we believe and what is true are often two very different things" (p. 182). I found this chapter to be both intriguing and extremely unsettling.

All the chapters are equally compelling, but—thankfully—not as unsettling. The book is filled with random tidbits of knowledge, most of which were new to me. I found the footnotes and gray boxes filled with asides to be the most interesting facts. Did you know, for instance, that "Mating between two stationary barnacles some distance apart is understandably difficult. Nature always finds a way, however, and as a result barnacles have extraordinarily long penises, up to eight times their body length" (footnote on p. 52). Or that "Lord Byron acquired his bear in protest of Trinity College rules that barred him from keeping his beloved

dog there. Technically, Cambridge University did not specify bears in its statutes relating to lodgings and pets and so, being something of a smart-ass, he argued that they could not deny him a flesh-eating undergraduate ursine companion" (gray box on p. 217). If you find these random facts interesting, you're sure to love *The Complete Guide to Absolutely Everything*! With that said, Rutherford and Fry weave these seemingly random facts into a coherent book that questions absolutely everything.

**Sara Buchanan**
Sara Buchanan works at LCS, a property management software company, in Cincinnati, OH. In her free time, she's an avid reader, enjoys cooking, and doting on her cats: Buffy and Spike.

## Pandora's Toolbox: The Hopes and Hazards of Climate Intervention

Wake Smith. 2022. Cambridge University Press. [ISBN 978-1-316-51843-4. 402 pages, including index. US$24.95 (hardcover).]


We've delayed so long that dangerous climate change is now inevitable. Reducing greenhouse-gas emissions is laudable, but insufficient to prevent what's coming. To mitigate those consequences, we must contemplate the scary topic of climate intervention ("geoengineering"). Why scary? Because the research is incomplete and getting the solutions wrong may have disastrous consequences. But as Wake Smith notes in *Pandora's Toolbox: The Hopes and Hazards of Climate Intervention*, geoengineering "sounds like a terrible concept until you...realize that not geoengineering would likely prove worse" (p. xviii).

*Pandora's Toolbox* is a remarkable technical communication achievement: Smith explains a dauntingly intimidating topic with clarity and grace, and never overwhelms. Some scientific knowledge and understanding of graphs will enrich the text, but you won't need more than grade school math to understand his argument. Chapters 1–4 thoroughly describe our situation. His analogies, such as describing atmospheric carbon dioxide (CO2) as an increasingly thick blanket that traps ever more heat, are clear and helpful. Chapter 5 describes climate economics and the danger of relying on traditional economics. The book's meat comes in chapters 6–7, which discuss mitigation (reducing future pain); chapter 8, which discusses adaptation (coping with pain); and chapters 10–15, which discuss geoengineering (further reducing future pain). Broadly speaking, we must both remove CO2 from the atmosphere and reduce the solar radiation reaching Earth's surface. No one solution will solve the problem in coming decades: we'll need to combine them all to undo the effects of more than 100 years of cumulative damage. Forty pages of references support this argument.

A book of this scope inevitably has omissions, such as noting (p. 69) that high temperatures improve plant growth but not that high CO2 may divert most of that improvement into inedible tissues rather than food or that dryland rice will reduce methane emission from rice paddies (p. 107). Also, we've only just begun to realize the danger of methane release from hydroelectric reservoirs and permafrost. The index should also be twice as long. None of this undermines the book's fundamental message.

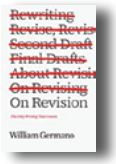
The bad news is that the "real work of achieving net zero and then negative emissions will require substantial economic sacrifice by virtually every current and future human for many generations" (p. xvi). Smith emphasizes that technology notwithstanding, human problems require human solutions: decades of failed climate accords demonstrate the need for fundamentally refocusing on the collective good. "There is a chance that this may not work out as badly as some alarmist observers think—but we are still sailing off the edge of the map" (p. 78). It's increasingly obvious that we face a crash landing; the good news is that it's our choice how hard we hit and who will walk away from the crash.

*Pandora's Toolbox* is an essential work for providing the information we need to understand the risks we face and invest wisely in solutions.

**Geoff Hart**
Geoff Hart (www.geoff-hart.com) is an STC Fellow and science editor with more than 35 years of writing, editing, translation, and scientific communication experience.

## On Revision: The Only Writing That Counts

William Germano. 2021. The University of Chicago Press. [ISBN:978-0-226-41065-4. 204 pages, including index. US $20.00 (softcover).]




*On Revision: The Only Writing That Counts* is a valuable resource for writers of academic and scholarly works. The author, a professor of English literature at the Cooper Union, has written books on scholarly writing and publishing and lectured on this topic across the US and internationally.

William Germano wrote the book based on his interest in the topic, his recognition that many writers find the revision process difficult, and the lack of information on revising academic writing, "…I couldn't find anything that had more than a few encouraging pages about how (much less why) to revise academic writing" (p. 4).

While Germano provides a wealth of practical exercises, advice, and techniques to improve a writer's work, he also guides readers in a thoughtful discourse on the process and importance of revision. I enjoyed Germano's use of examples from a broad range of genres and fields to reinforce his points.

In his own words, "I knew I wasn't writing a reviser's style guide. I knew that I wanted to bring into the same frame both a philosophy of writing, especially as it applies to the range of forms and styles that academic publishers engage, as well as some centrally important practical issues" (p. 6).

Using that framework, the author begins the revision process by asking his readers in chapters 2 and 3, "…to reflect on what you have, what you know, [and] what you want to say better" (p. 8). If you think of the revision process as a journey, then chapters 2 and 3 reflect the essential preparatory stage. In chapter 2, Germano introduces nine principles that he stresses are the foundation of the revision process. In chapter 3's succinctly titled *Know What You've Got,* he covers different approaches to the writing and revision process to assist writers in gaining a deeper understanding of their work.

Germano then guides readers through chapters 4, 5, and 6, which focus on the three critical components of revision: argument, architecture (writing structure), and audience. Finally, chapter 7, provides in the author's words "a summing up." *On Revision* also includes a short bibliography for readers who would like to continue exploring this topic.

**Ann Marie Queeney**

Ann Marie Queeney is an STC senior member with more than 20 years' technical communication experience primarily in the medical device industry. Her STC experience includes serving as a Special Interest Group leader, 2020-2022 Board member, and CAC (Communities Affairs Committee) Chair. Ann Marie is the owner of A.M. Queeney, LLC.

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| STC Annual Membership (any membership type for Foundation certificants) | 2 |
| STC Recorded Webinar (self-study) | 1 |
| STC Live Educational Webinar (free, sponsored, and community webinars excluded) | 2 |
| STC Online Courses | 6 |
| STC Summit Pre-Conference Courses (full day) | 6 |
| STC Summit Pre-Conference Courses (half day) | 3 |
| STC Annual Summit | 8 |
| Begin and complete a college-accredited course related to the Technical Communication field | 8 |
| Published articles that relate to any aspect of *Technical Communication* (2/article) | 2 |
| Published books publicly available on topics related to *Technical Communication* (5/book) | 5 |
| Presentations at conferences related to aspects of *Technical Communication* (2/presentation) | 2 |
| **Total needed within 2 years post-certification date** | **12** |

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Sean C. Herring, Editor

**The following articles on technical communication have appeared recently in other journals. The abstracts are prepared by volunteer journal monitors. If you would like to contribute, contact Sean Herring at SeanHerring@MissouriState.edu.**

**"Recent & Relevant" does not supply copies of cited articles. However, most publishers supply reprints, tear sheets, or copies at nominal cost. Lists of publishers' addresses, covering nearly all the articles we have cited, appear in *Ulrich's international periodicals directory*.**

## Audience analysis

### *The interaction effect of crisis communication and social support on the emotional exhaustion of university employees during the COVID-19 crisis*

Charoensukmongkol, P., & Phungsoonthorn, T. (2022). *International Journal of Business Communication, 59,* 269-286. https://doi.org/10.1177/2329488420953188

"Although formal communication from an organization's management is crucial during a crisis to reduce the uncertainties of employee, less is known about the moderating role of social support that could make employees rely less on formal communication to reduce those uncertainties. Grounded in uncertainty reduction theory, this research examines the role of crisis communication on the perceived uncertainties and emotional exhaustion of employees who work at private international universities that have been affected by the COVID-19 crisis. Furthermore, this research explores the moderating effect of social support in terms of supervisor support and coworker support on the association between crisis communication and perceived uncertainties. Questionnaire data were collected from 300 employees from two private international universities in Thailand. Partial least squares structural equation modeling was used for data analysis. The analysis shows that perceived uncertainties mediate the negative association between crisis communication and emotional exhaustion. Moreover, the moderating effect analysis shows that the association between crisis communication and perceived uncertainties is significantly moderated by coworker support, but not by supervisor support. Simple slope analysis also clearly shows that the negative association between crisis communication and perceived uncertainties only presents in employees with a low level of coworker support. For employees with high coworker support, crisis communication does not associate negatively with perceived uncertainties. This research implies that the informal communication that employees obtain from social support could play a compensatory role for their need to rely on formal communication to reduce uncertainties during the crisis."

**Katherine Wertz**

## Collaboration

### *What is it that's going on here?: Community partner frames for engagement*

Shah, R.W. (2020). *Community Literacy Journal, 14*(2), 72–92. https://doi:10.25148/14.2.009037

"Frames—defined as mental structures built through language and symbols that categorize our thoughts and experiences—have a significant impact on partnerships, shaping how participants understand the nature of the collaboration. While scholars have explored how teachers might frame engagement partnerships for university students and administrators, the field has yet to deeply draw on framing theory to examine community partner frames. This article argues that framing theory can shed light on how intentional frames might foster healthier partnerships for community members, offering a robust tour of framing theory and illustrating its impact through an analysis of how one community leader frames a high school-college writing partnership for local youth—ultimately

suggesting that community partners may have much to teach the field of community writing about how to use frames rhetorically in engagement contexts."

**Edward A. Malone**

## Communication

### *Breaking the sound of silence: Explication in the use of strategic silence in crisis communication*

Pang, A., Jin, Y., Seo, Y., Choi, S. I., Teo, H., Le, P., & Reber, B. (2022). *International Journal of Business Communication, 59*, 219-241. https://doi.org/10.1177/23294884211046357

"Crises present organizations with the 'rhetorical exigency' to enact control. Silence is not an option. This study, as the first empirical examination of Le et al's (2019) seminal study on silence in crisis communication, examines, first, if silence can be strategically used as a bona fide strategy; second, under what circumstances should silence be broken; and third, when silence is broken, how it affects (a) organizational reputation, (b) societal risk perception, and (c) the publics' crisis information sharing intention. An online experiment was conducted using a nationally representative sample in the United States. Participants were recruited in 2019 via a Qualtrics panel. The stimuli used in this study consisted of two components: (1) an explanation about a fictitious company; and (2) two types of silence breaking (forced vs. planned) embedded in each stimulus accordingly after the same crisis incident. Four hypothesis were conceptualized. They were all supported. Collectively, they showed that the effect of silence-breaking type on crisis information sharing intention was mediated by societal risk perception, which is conditioned by participants' level of perceived organizational reputation. Silence, or failure to fill the information vacuum, has not been an option to consider thus far as it suggests the organization is 'not in control.' However, this study suggests the types of silence organizations can adopt and the modes the organizational silence can be broken. It provides a new lens for organizations to engage in business communication."

**Katherine Wertz**

### *Creating order out of chaos? Development of a measure of perceived effects of communication on the crisis organizing process*

Fuller, R. P., Pyle, A., Riolli, L., & Mickel, A. (2022). *International Journal of Business Communication, 59,* 174-192. https://doi.org/10.1177/2329488420979657

"Organizations are important sources of communication during natural-hazard crises. How members of an organization perceive these communications (e.g., creating confusion, causing disorder, providing clarity, and restoring order) influences response and recovery from such a crisis. Using Chaos Theory as a guiding framework, the authors developed a new instrument measuring the perceived effects of an organization's communication on crisis-organizing processes. Three distinct studies were conducted to assess the reliability and validity of this new instrument: the 'Perceived Effects of Communication on the Crisis-organizing Process (PEC-COP)' scale. This one-factor scale can be used by both scholars and practitioners to assess the effects of an organization's communication on how people organize (i.e., react and respond) during a crisis. By gaining greater insight into how an organization's communication is perceived, the organization can better prepare to communicate in ways that promote efficient and effective crisis-organizing processes throughout a natural-hazard crisis. Effective communication can create order out of chaos."

**Katherine Wertz**

### *Investigating disembodied university crisis communications during COVID-19*

Sparby, E., & Cox, C. (2022). *Communication Design Quarterly, 10*(1), 4–13. https://doi.org/10.1145/3507454.3507455

"The COVID-19 pandemic has shown us many weaknesses in crisis communication, especially at universities where campus communities are often rendered as disembodied monoliths. In this article,

[the researchers] select a case example from [their] own institution to show that when bodies are erased from university crisis communication, power imbalances are reinscribed that render campus community members powerless. Using a critical feminist methodology, [the authors] end with several suggestions for more inclusive embodied institutional crisis messaging."

**Lyn Gattis**

## Design

### *Experience report streamlining complex website design using a content audit selection heuristic*

Altamirano, A. & Stephens, S. H. (2022). *Communication Design Quarterly, 10*(1), 14–23. https://doi.org/10.1145/3507454.3507456

"In this project experience report, [the authors] describe [their] experience working as researchers specializing in technical communication that informed the risk communication decisions for an interdisciplinary, grant-funded, risk communication website called HazardAware." After discussing "how content audits serve as a website design research method," the authors present the "Content Audit Selection heuristic in a process flowchart format to enable communicators to understand how practical application of content audits serve as a formative tool to streamline the decision-making processes for complex website design content." The authors end by describing "how [they] used the Content Audit Selection heuristic to inform the risk communication decisions for HazardAware."

**Lyn Gattis**

### *The women behind Times New Roman: The contribution of type drawing offices to twentieth century type-making*

Savoie, A. (2020). *Journal of Design History, 33*(3), 209–224. https://doi.org/10.1093/jdh/epaa025

"The narrative behind the creation of Times New Roman, one of the most widely used typefaces in the western world, is well established and revolves around famous male figures of British typographic history. This article recognises the role played by the Monotype Type Drawing Office (TDO), and of its draughtswomen in particular, in the making of the typeface. While female figures are largely absent from type histories, this contribution emphasises the key role played by the women who worked on adapting Stanley Morison's original idea for Times New Roman into a fully working, extensive type family. Based on original archival material, it discusses the background of these women, their working conditions, and the nature of their contribution to type-making. In a wider perspective, this article advocates a more inclusive and collaborative view of design history and of its narratives."

**Edward A. Malone**

## Discourse communities

### *Exclusionary public memory documents: Orientating historical marker texts within a technical communication framework*

O'Brien, A. (2022). Technical Communication Quarterly, *31*, 111–125, https://doi.org/10.1080/10572252.2021.1977851

"This paper theorizes historical marker texts (HMT) as succinct, public facing informational reports that reinforce white supremacy and minimize or erase the memory of Black, Indigenous, and people of color (BIPOC) individuals. In this layered content and discourse analysis, I evaluate the demographics of the commissioners at the local and state level, the instructions for the HMT application, and the text of a selected group of HMTs."

**Rhonda Stanton**

## Diversity

### *Ethical deception: Student perceptions of diversity in college recruitment materials*

Dayley, C. (2022). *Communication Design Quarterly, 10*(1), 38–50. https://doi.org/10.1145/3507454.3507458

"The use of images of students from traditionally underrepresented racial and ethnic backgrounds in college recruitment materials presents a seemingly difficult dilemma. Should colleges and universities use diversity in recruitment materials to try and attract students from underrepresented racial and ethnic backgrounds even if those images do not accurately represent the amount of diversity at the university? To discover student perceptions relating to this question, [the researcher] used a mixed-methods approach," surveying 117 students and then interviewing 10 survey participants. "Survey and interview questions were based on utilitarian versus deontological ethics with an emphasis on whether exaggerating diversity in recruitment materials is ethical. The results of this exploratory study showed that most students believe using a disproportionate amount of diversity in recruitment materials is unethical. Student participants who identified as a person from an underrepresented racial/ethnic group indicated that it is unethical to exaggerate diversity in recruitment materials at a higher percentage than their white counterparts. This is likely because people from underrepresented backgrounds face a much higher risk of harm from misleading recruitment materials than their white peers."

**Lyn Gattis**

## Editing

### *Unjust revisions: A social justice framework for technical editing*

Clem, S., & Cheek, R. (2022). *IEEE Transactions on Professional Communication, 65*(1), 135–150. https://doi.org/10.1109/TPC.2021.3137666

"There is a lack of conceptual framework for how to develop more inclusive practices in the subfield of technical editing. . . . Some researchers have posited theories, like feminism and rhetorical theory, as ways to conceptualize technical editing. This piece extends that literature into social justice using Walton, Moore, and Jones›s 3Ps heuristic of positionality, privilege, and power" to question ideologies within technical editing pedagogy and suggest strategies to make that pedagogy more inclusive. The authors used the 3Ps social justice heuristic to analyze rhetorically "the major academic works in technical editing, including books, textbooks, and academic articles." The authors found "strong instrumentalist underpinnings to much of the current literature in technical editing, making the goal of technical editing linguistic conformity to American Standard English (ASE) at the expense of linguistic diversity. [The researchers] offer a conceptual framework, the inclusive editing paradigm (IEP), to challenge that linguistic hegemony in technical editing and provide technical editors with theoretical and practical foundations for developing a more inclusive editing practice." The authors conclude "[m]ore work needs to be done to shift technical editing in a more inclusive direction."

**Lyn Gattis**

## Education

### *Art advocacy: Applying a public memory rhetorical framework to health crisis communication*

Taylor, M.A., & Glowacki, E.M. (2022). *Health Communication.* Advanced online publication. https://doi.org/10.1080/10410236.2022.2071391

"Health campaigns and public health messaging strategies often rely on text-based efforts to communicate with audiences. As research grows in the areas of health and visual media, this essay puts a rhetorical framework of public memory in conversation with health campaign communication to show possibilities for audiences who are less likely to be moved by traditional institutional health narratives. The artifact for analysis is an art installation by Domenic Esposito, who in 2018 designed and placed a large scale "Opioid Spoon" at the headquarters of Purdue Pharma

in Stamford, Connecticut. After situating public art as an effective way to advance health crisis messaging, [the authors] then preview the next phase of this research project that analyzes COVID-19 art as a counterpublic health narrative. [The authors] conclude by suggesting future health communication scholarship engage with the intersections of public health art, memory, and advocacy in order to reflect more accurately how communities experience health inequity."

**Walter Orr**

## Ethical issues

### *Building toward more just data practices*

Gouge, C. C., & Carlson, E. B. (2022). *IEEE Transactions on Professional Communication, 65*(1), 241–254. https://doi.org/10.1109/TPC.2021.3137675

"This tutorial offers technical and professional communication (TPC) professionals a heuristic designed to support more just data practices. . . . Understanding how data contribute to discussions of public problems matters, especially in times of crisis during which multiply marginalized communities are disproportionately affected. Critical Data Studies clarifies how data practice and priorities emerging from various domains of power exacerbate structural inequalities. If we recognize, reveal, and reject data practices that cast data as if they were neutral or fixed, we can ensure that our data practices as TPC professionals are more just. . . . By acknowledging the relationship between data and context, we can promote better, more just data practices, preparing TPC professionals to work alongside community stakeholders in intersectional coalitions and challenging the conditions that lead to unjust data that fail to represent, over-represent, or blatantly misrepresent the realities of vulnerable communities."

**Lyn Gattis**

## Health communication

### *Facing the strain: The persuasive effects of conversion messages on COVID-19 vaccination attitudes and behavioral intentions*

Conlin, J., Baker, M., Zhang, B., Shoenberger, H., & Shen, F. (2022). *Health Communication.* Advanced online publication. https://doi.org/10.1080/10410236.2022.2065747

"This study examined two-sided conversion messages in relation to one-sided advocacy messages in reducing vaccine hesitancy related to COVID-19 vaccine uptake. Results demonstrated that, for vaccine-hesitant participants, conversion messages increased pro-COVID-19 vaccination attitudes and behavioral intentions. For high vaccine-hesitant participants, the relationship between conversion messages and attitudes toward COVID-19 vaccinations was mediated through source credibility. For low vaccine-hesitant participants, mediation occurred through counterarguing. Findings have implications for health message tailoring related to COVID-19 vaccine uptake."

**Walter Orr**

## Information management

### *Information processing and data analytics for decision making: A journey from traditional to modern approaches*

Nanda, P., & Kumar, V. (2022). *Information Resources Management Journal, 35*(2), 1-14. https://doi.org/10.4018/IRMJ.291693

"Decision making is required by all organizations; however, the decision-making styles may differ. The most commonly used decision styles include (1) autocratic, (2) democratic, (3) consensus, and (4) participatory. With the globalization and expansion of businesses, professionals have become highly dependent upon the technology to support the decision-making process, and decision-support systems have come up as the fastest growing discipline. The present work discusses the evolution of computerized decision

support, considering the (1) model-driven, (2) data-driven, (3) communication-driven, (4) document-driven, and (5) knowledge-driven decision-support systems. All three different business levels—operational, tactical, and strategic—have been considered in the present work to review the development of decision-support systems. The traditional data analysis-based approaches have been compared with the latest data analytics approaches including social media analytics and web analytics. Examples from the different industry sectors have been incorporated for better illustrations of decision support."

**Yvonne Wade Sanchez**

## Instructions

### *Drawing into being: Charter graphics and their functions*

Dush, L (2022). Journal of Business & Technical Communication, *36*(2), 165-189. https://doi.org/10.1177/10506519211064615

"Prior researchers have identified charter documents as texts that serve an outsize role in stabilizing social reality and mediating work, writing, and network building. While charter documents are typically authoritative and text-only tomes, this article expands the category to include *charter graphics*, visual texts that serve similarly important genre and network functions. Through retrospective analysis of one charter graphic and its role in a decade-long project by a nonprofit organization, this article demonstrates the potential rhetorical, social, and network functions of charter graphics; distinguishes them from charter documents; and offers suggestions for both practitioners and researchers."

**Sean C. Herring**

## Intercultural communication

### *Bodies of Proof: COVID-19 and unwitnessed remote work*

Randazzo, C. (2022). *Technical Communication Quarterly, 31,* 143–158, https://doi.org/10.1080/10572252.2021.1998639

"Using a case study of four professionals who suddenly worked from home during COVID-19, this article discusses participants' experiences of proving work when their bodies were not physically near coworkers ("proof"). I explain proof's features; participants' concerns and responses to it; its consequences for workers; and its potential devaluation of nonproductive, unwitnessed processes. I suggest technical and professional communicators are in a kairotic moment for negotiating the value of nonproductive time and unwitnessed work."

**Rhonda Stanton**

## Language

### *Tools for overcoming oppression: Plain language and human-centered design for social justice*

Sims, M. (2022). *IEEE Transactions on Professional Communication, 65*(1), 11–33. https://doi.org/10.1109/TPC.2022.3150236

"Technical and professional communication (TPC) audiences are increasingly international and intercultural. Some of these audiences, such as US asylum applicants, may be vulnerable and suffering trauma following violations of their human rights and dignity." This study asks whether "the language and design strategies in the I-589 application and instructions [are] appropriate for their audience from an HCD perspective" and how the documents might be revised and improved in the service of social justice. "This article uses adapted plain language guidelines combined with human-centered design guiding principles to perform a qualitative document analysis and explore revisions of the application and instructions." The author finds "the I-589 documents

are not appropriate for their audience and proposes revisions to correct major issues." The author concludes by arguing for continued integration of plain language and human-centered design in practice and pedagogy, research surrounding the ways in which technical and professional communicators should balance the needs of vulnerable audiences with the interests of powerful stakeholders, and meaningful collaboration between them and government institutions."

**Lyn Gattis**

## Leadership

### *Expanding ethical pedagogy in technical communication: Learning from nanobots*

Duncan, M. (2022). *Technical Communication Quarterly, 31,* 207–219, https://doi.org/10.1080/10572252.2021.1977850

"Attention to the ethical dimension in technical and professional communication (TPC) is paramount, especially when dealing with new, emerging technologies. Such technologies frequently rest within corporate environments that may resist ethical gatekeeping. I suggest several methods by which TPC instructors can critically question the limits of corporate structure to show students that they have a variety of options for responding to assignments other than those their employers may offer them."

**Rhonda Stanton**

### *Fostering employee trust via effective supervisory communication during the COVID-19 pandemic: Through the lens of motivating language theory*

Men, L. R., Qin, Y. S., & Jin, J. (2022). *International Journal of Business Communication, 59,* 193-218. https://doi.org/10.1177/23294884211020491

"This study examines how supervisory leadership communication during the COVID-19 pandemic fostered employee trust through the lens of motivating language theory. Drawing insight from self-determination theory, this study also reveals the mediating effects of employees' psychological need satisfaction for competence and relatedness in this process, which help explain how supervisory leadership communication influences employee trust. Through an online survey of 393 full-time employees from various organizations in the U.S., results showed that supervisory use of meaning-making (0.15), empathetic (0.60), and direction-giving language (0.27) during the pandemic all showed significant positive effects on employee trust toward leadership and the organization directly, and indirectly through satisfying employees' psychological need for competence and relatedness. Theoretical and practical implications of the findings are discussed."

**Katherine Wertz**

## Political discourse

### *To wear or not to wear: A commentary on mistrust in public comments to CDC tweets about mask-wearing during COVID-19*

Batova, T. (2021). *International Journal of Business Communication,* https://doi.org/10.1177/23294884211008584

"Trust is an important component of crisis communication, and social media has been shown a promising avenue for building trust. Yet, mixed findings about how effectively government organizations utilize social media during health crises such as pandemics or infectious disease outbreaks require further research to better understand how trust is created and destroyed. This study investigates the factors that reflect mistrust in the public comments to the CDC tweets about mask-wearing during the 3 months after the first reported case of COVID-19 in the U.S. The findings show that multiple factors representing mistrust were present in the public comments. What is more, the feeling of anger was growing in the comments as the health crisis progressed, which also could have been trust-damaging."

**Yvonne Wade Sanchez & Katherine Wertz**

## Public relations

### *Tactical risk communication: Observations from teaching and learning about crisis communication during COVID-19*

Bishop, T., Capan, E., Larsen, B., Preston, R., & Sparby, E. (2022). *Technical Communication Quarterly,* 31, 175–189, https://doi.org/10.1080/10572252.2021.2008509

"In a Spring 2020 Technical and Professional Communication (TPC) course on risk communication, we watched the COVID-19 pandemic unfold and discussed how technical communicators can foreground vulnerable and marginalized populations who are often excluded from official communication channels. The article below offers perspectives on tactical communication and/or coalition building during a pandemic, coining the term *tactical risk communication* (TRC) and examining how TRC functions in the face of a global health crisis."

**Rhonda Stanton**

## Research

### *Information adequacy and strategic behavioral change communication as a pandemic management tool: The mediating role of interaction resonance*

Bashir, H., Nangoli, S., Musaasizi, Y., Nakajubi, F., Basemera, M., & Ayibo, C. (2022). *International Journal of Business Communication, 59,* 242-268. https://doi.org/10.1177/23294884211027545

"A strategic approach to behavioral change communication streamlines communication processes of a health institution in a crisis setting like COVID-19 pandemic. In such a setting, it is important to focus communication efforts to reach the different audience groups and ensure common understanding and willingness to act by all the groups in order to achieve the institution's mission of curbing the pandemic. This study contributes to these efforts by examining the mediating effect of interaction resonance in the relationship between information adequacy and strategic behavioral change communication. The study adopted a cross sectional survey design that involved collecting quantitative data from 223 health organizations of Uganda's health sector in the different regions of the country. In order to test the study hypotheses, the study used Structural Equation Modeling of AMOS and the bootstrapping approach to test the mediating role of interaction resonance. The results revealed that interaction resonance fully mediates in the relationship between information adequacy and strategic behavioral change communication. This implied that having adequate information per say, does not cause behavioral change among the intended message recipients but requires a communication system that enables high quality interactions."

**Katherine Wertz**

## Rhetoric

### *Precarious data: Crack, opioids, and enacting a social justice ethic in data visualization practice*

Welhausen, C. A. (2022). *IEEE Transactions on Professional Communication, 65*(1), 50–69. https://doi.org/10.1109/TPC.2022.3144826

"The linguistic framing strategies used in media reporting on illegal drugs have been extensively documented, but less attention has been directed toward visuals, particularly data visualizations." This study investigates "the rhetorical strategies used in data visualizations published during the crack and opioid drug epidemics, respectively" and asks whether and how "these strategies advance dominant media narratives that crack addiction should be criminalized but opioid addiction should be treated like a public health issue. . . ." The author applies "the concept of 'scripto-visual' rhetoric to select data visualizations published by mainstream news media during both drug epidemics," finding "these graphics escalated the perceived threat during both drug epidemics but different scripto-visual rhetorical strategies were used." The author concludes by "arguing that a social justice ethic is needed in data design work," proposing "a critical heuristic

constructed from Jones et al.'s positionality, privilege, and power framework that can be used analytically or as an inventional tool to tease out the ways particular scripto-visual rhetorical decisions may be promoting inequities."

**Lyn Gattis**

### *Writing climate change assessments: Scientific author challenges and rhetorical negotiations*

Reeves, C.A. & Ross, M. (2022). *Journal of Technical Writing and Communication,* 52(2), 182-212. https://doi.org/10.1177/0047281621989640

"The rhetorical challenges and deliberations of scientific authors writing climate change assessment reports have received scant scholarly attention. As [the authors'] interviews with 21 authors reveal, authors engage with multiple stakeholders who bring diverse scientific, political, economic, and cultural interests and perspectives. They must remain aware of politically motivated climate change denial and scientific illiteracy while remaining committed to producing policy relevant rather than policy prescriptive statements. These challenges lead to intense rhetorical negotiations over the lexical and visual features of a document they hope will deflect denial and contribute to meaningful policy solutions."

**Anita Ford**

## Scientific writing

### *Digital enhancements of scientific content at virtual and hybrid conferences*

Zhou, Q. (2022). *American Medical Writers Association Journal,* 37(1), 35-37. https://doi.org/10.55752/amwa.2022.121

"Since the beginning of 2020, scientific conferences around the globe have evolved quickly to adapt to a virtual or hybrid format when in-person meetings were disrupted by the COVID-19 pandemic. With the digital platforms now in place to enable virtual participation, interaction with scientific content in a digital format will likely become a new norm of the scientific conference experience. Digital enhancements of scientific presentations and posters may help bridge the gap of communication in a virtual format and may extend the reach of scientific content. This article provides a brief overview of common types of digital enhancements and summarizes insights from two conference organizers from their conversations at the "InformED" podcast. Researchers, conference organizers, and medical communication and publishing professionals will continue to optimize the digi-tal enhancements and explore innovations to maximize the value of scientific content disseminated at virtual and hybrid scientific conferences."

**Walter Orr**

## Teaching

### *Teaching participative justice in professional writing*

Hashlamon, Y. & Teston, C. (2022). *Technical Communication Quarterly,* 31, 159–174, https://doi.org/10.1080/10572252.2021.2000031

"Technical and professional communication (TPC) curricula tend to prioritize hyperpragmatist learning outcomes, objectives, and activities. Drawing on a grounded theory analysis of curricular self-assessment data, including interviews with community partners, we argue that TPC in the U.S. is at constant risk of co-option by market logics. Through a speculative curricular framework that works toward building more just, liveable worlds, this essay reimagines TPC curricula as an opportunity to redress inequities caused by exploitative market logics."

**Rhonda Stanton**

## Technology

### *Antiprogrammatic action and the student ID: An ANT 2.0 analysis*

Foltz, H. (2022). *Technical Communication Quarterly,* 31, 126–142, https://doi.org/10.1080/10572252.2021.1963488

"This article examines a system of organizational keypunch identification technology between 1966 and 1972 via diachronous actor-network theory (ANT 2.0) visualized with ForceAtlas2, a network spatialization algorithm. This article's greatest impacts lay in its analytic focus on programs and antiprograms and its evolution of existing visualization methodology, most notably by incorporating community detection and partitioning, which helps scholars and readers more easily identify macrotrends in the evolution of networks."

**Rhonda Stanton**

## Usability studies

### *Analysis of direct-to-consumer healthcare service advertisements on television: An application of the patient expectation framework*

Park, S.Y., Hill, K., Yun, G.W., Friedman, S., & Coppes, M.J. (2022). *Health Communication.* Advanced online publication. https://doi.org/10.1080/10410236.2022.2051349

"Direct-to-consumer advertisements for healthcare services constitute a rare channel of public communication where consumers see and hear directly from their local providers and healthcare organizations. Although spending on these advertisements has increased drastically during the past decades, research on their content and effects remains rare. To fill this gap, [authors] analyzed primetime television advertisements for healthcare services directly targeting consumers. The advertisements were collected from the two largest media markets in Nevada for one month. In total, 795 advertisements were identified, and 106 of them were non-duplicates. Analysis revealed that the advertisements focused on patients' good health outcomes by showing them smiling, going out and about, having fun with others, and enjoying rigorous physical activities. On the other hand, the advertisements focused less on the providers. Although the advertisements often showed providers in clinical settings, basic information about their professional degrees was often missing. Mentions of providers' other qualifications and professional experiences were even scarcer. Also, a substantial number of advertisements failed to show providers interacting with patients. Additional analysis of patient and provider characteristics revealed under-representation of racial or ethnic minority and older adult patients. Representation of women and minorities as providers was even more uncommon. [Authors] discussed the implications of these findings from the perspective of patient expectation and made suggestions to help providers improve their direct-to-consumer advertisements."

**Walter Orr**

## User experience

### *Day or night at the museum: A UX analysis of virtual exhibits*

Williams, J.: (2022). *Journal of Technical Writing and Communication,* 52(2), 166-181. https://doi.org/10.1177/00472816221074101

"The virtual museum tour has claimed new audiences during the pandemic, but not all virtual tours are created equal. First, this paper . . . explore[s] the world of virtual museums and UX scholarship. Secondly, the paper . . . propose[s] a viable set of options in determining effectiveness of virtual museums. Thirdly, the paper . . . discuss[es] specific examples of UX design among museum virtual exhibits offered currently, specifically those that do not require any additional downloads or software. Finally, the paper . . . discuss[es] the implications of high quality UX design within the realm of virtual museum tour."

**Anita Ford**

### *How real is too real? User-testing the effects of realism as a risk communication strategy in sea level rise visualizations*

Richards, D. & Jacobson, E. (2022). *Technical Communication Quarterly,* 31,190–206, https://doi.org/10.1080/10572252.2021.1986135

"In visual risk communication, there has been a push toward using realism to show potential effects of sea level rise on coastal communities, often with the assumption that higher degrees of realism are more effective. We challenge this assumption by sharing the results of a user-based study exploring reactions to simulated images of flooded landmarks. The findings identify nuanced rhetorical and emotional responses, encouraging technical communicators to contribute to risk scholarship in psychology and cartography."

**Rhonda Stanton**

### *Understanding podcast users: Consumption motives and behaviors*

Chan-Olmsted, S., & Wang, R. (2022). *New Media & Society,* 24(3), 684-704. https://doi.org/10.1177/1461444820963776

"Through a large-scale national survey, this study provided the first comprehensive examination of podcast users in the United States from the perspectives of motivation and usage. It deepened our understanding of this new on-demand audio platform in the context of consumption drivers, behaviors, and competing media options. The results showed that entertainment, information, and audio platform superiority were the most important motivators for podcast consumption. In addition, motives were found to affect listening behaviors, including listening settings, width, depth, and routine of listening, and usage of competing audio media, such as regular radio, online radio, and streaming music. The findings revealed that podcasting is a distinct medium with unique characteristics rather than a mobile, on-demand extension of existing audio platforms like radio. Podcast consumption, especially on today's complex media platforms, is multidimensional and should be measured from multiple aspects and examined in various settings."

**Yvonne Wade Sanchez**

## Writing

### *Chinese women's reproductive justice and social media*

Wang, H. (2021). *Technical Communication Quarterly,* 30, 285–297, https://doi.org/10.1080/10572252.2021.1930178

"By utilizing rhetorical analysis with a focus on agency and feminist rhetoric, this article focuses on China's most popular pregnancy and mothering app – Babytree – to examine how users assume the mantle of technical writers, writing their pregnant and mothering experiences into online narratives and selling them to generate income. This article shows how Chinese women take advantage of the technical affordances of Babytree to share their embodied experiences and, in so doing, respond to and push back against the traditional norms of motherhood and healthcare provision. The women whose experiences are examined here participate in social media as a way to reenter job markets by using their embodied experiences, thus asserting their rhetorical agency politically and economically while implicitly critiquing the traditional situation of contemporary pregnant women and the state of motherhood in China."

**Rhonda Stanton**